ATLC-107-932-104
Issue 2, August 1985

INTERVIEW®

COMSTATE™ I

Operator's Field Reference Guide

ATLANTIC RESEARCH CORPORATION
Teleproducts Division

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Printed in USA

NOTICE

This reference guide is intended as a convenient reminder when you are using COMSTATE I in the field. For comprehensive operating instructions, see the TECHNICAL MANUAL FOR INTERVIEW COMSTATE I, ATLC-107-932-100.

This guide is written for units with Software Version 12.04 or higher. Atlantic Research Corporation reserves the right to improve this manual or the equipment that it describes without prior notice. Further software releases will not necessarily affect the material covered in the manual.

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USING THIS GUIDE

This Field Reference Guide is arranged in alphabetical order by the key sequence or topic printed at the upper outside corner of the page. You will probably use the guide in two different ways:

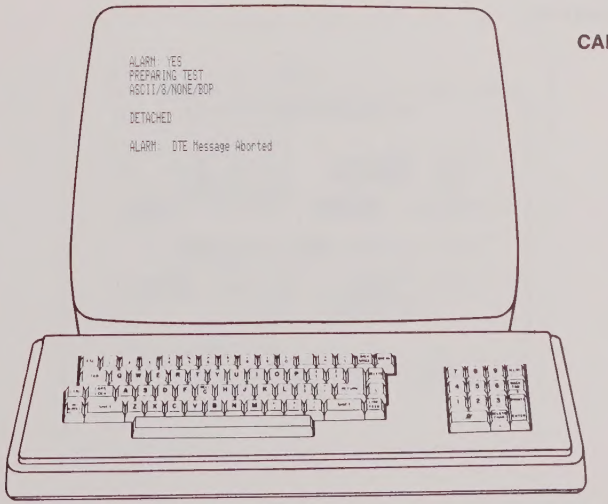
1. If you already know which menu or feature of the COMSTATE I you want to use, but don't remember how to use it, see the Table of Contents to find the page you need.
2. If you know what you want to do, but don't remember what menu or key you need to accomplish it, use the Topic Index.

AUTO CALLBACK

Since it may be impractical for a remote operator to stay on line with an unattended COMSTATE I for the duration of a long monitoring run or test, the unit has a call-back feature that responds to a trigger-activated alarm by dialing the remote terminal and reporting the alarm condition.

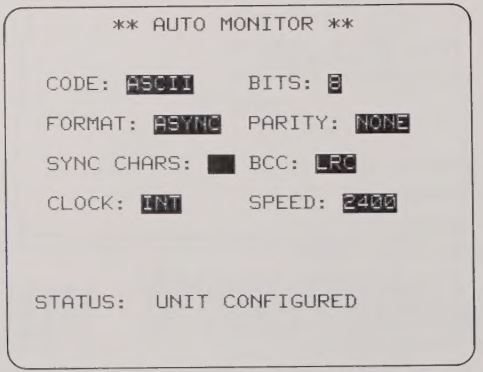
In normal operation, the operator at the remote terminal sets the trigger alarm (ALARM:YES on triggers 1-8), enters Run mode (ESC, R) to start the test, and detaches (ESC, D). Assuming a modem at the COMSTATE site that is intelligent enough to call and hang up and a modem at the operator site intelligent enough to answer, the remote terminal receives prompts and audible alarms as long as the test runs uninterrupted -- without tying up the line.

See PROGRAM D for menu parameters.



TW-932-086

AUTOMONITOR



Automonitor enables the user to monitor a data-communication line of unknown speed, code and protocol. In this mode, the COMSTATE I takes a sample of data, analyzes it, displays its reading of each characteristic, and shifts into Run mode and begins monitoring.

See PROGRAM 0 for Automonitor menu selection. Entering Run mode always initializes the autolearn process.

A BIT MASK may be entered in the following fields:

On the PROGRAM 0 menu, SUPPRESS and ENHANCE.

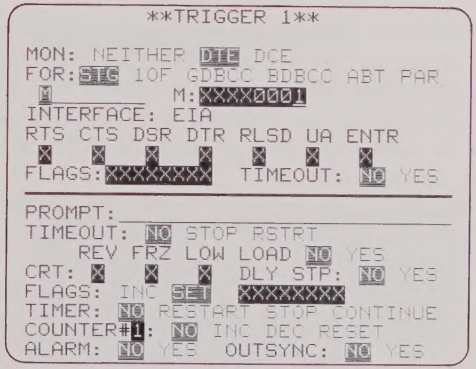
On the PROGRAM 1 menu (triggers), STR or 1OF character-entry field (line 5).

On the PROGRAM 7 menu, the WAIT FOR fields.

A low-intensity, reverse-image M appears in the data-entry field and an eight-bit mask is displayed. Bit 1, the first bit received, is at the far right; Bit 8, the last bit, at the left. Write over X (Don't Care) with 1 or 0 for any bits you want the COMSTATE 1 to monitor.

In the XMIT field of the PROGRAM 7 menu, the BIT MASK key enters the contents of the Message Buffer (PROGRAM 6 menu).

See also PROGRAM 0, 1, and 7.


TRIGGER 1
MON: NEITHER DTE DCE
FOR: STG 1OF GDBCC BDBCC ABT PAR
M M: XXXX0001
INTERFACE: EIA
RTS CTS DSR DTR RLSD UA ENTR
X X X X X X
FLAGS: XXXXXXXX TIMEOUT: NO YES
PROMPT:
TIMEOUT: NO STOP RSTRT
REV FRZ LOW LOAD NO YES
CRT: X X X DLY STP: NO YES
FLAGS: INC SET XXXXXXXX
TIMER: NO RESTART STOP CONTINUE
COUNTER#1: NO INC DEC RESET
ALARM: NO YES OUTSYNC: NO YES

CURSOR CONTROL

Program Mode

ENTER Key. Moves cursor to next field without altering selection. Special function: When you press ENTER with the cursor in a BIT MASK field, cursor returns to STRG, 1OF, ENHANCE, or SUPPRESS field at next available position.

CTRL-ENTER. Displays alternate PROGRAM 7 screen.

RIGHT, LEFT Arrow. Moves cursor to preceding (left) or next (right) position. Cursor will alter selections as it moves through a field (but not through a data-entry field such as flag, bit mask, string, WAIT FOR, ACTION).

CTRL-RIGHT Arrow. In data-entry field, inserts space at cursor position.

CTRL-LEFT Arrow. In data-entry field, deletes character at cursor position.

DOWN, UP Arrow. Moves cursor directly to preceding or next line. Will not alter selections.

CTRL-DOWN Arrow. On PROGRAM 7 menu, inserts line at cursor position. On PROGRAM 8 and PROGRAM 9 menus, displays successive pages in directory.

CTRL-UP Arrow. On PROGRAM 7 menu, deletes line at cursor position. On PROGRAM 8 and PROGRAM 9 menus, displays preceding page in directory.

CLEAR Key. Clears only the field in which the cursor is positioned.

CTRL-CLEAR. Returns entire menu to default condition.

ROLL. For the Interactive Test and the X.21 Protocol Control menus, there are some special ways to make selections. See PROGRAM 7, PROGRAM C.

Run Mode

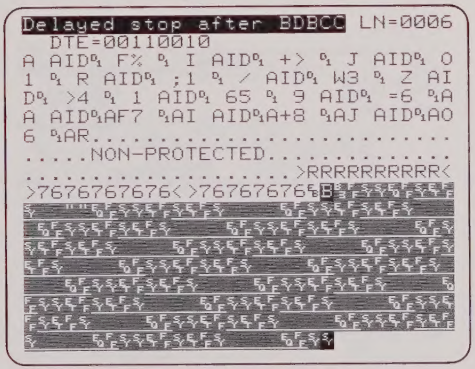
For cursor control in Run Mode, see FREEZE.

Delay Stop is a trigger action that freezes the data buffer after 256 more characters are received. It cannot be cancelled by triggers.

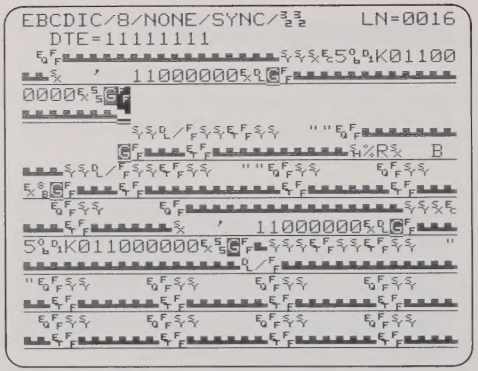
When the COMSTATE 1 is unattended and under remote control, Delay Stop freezes the data buffer and transmits the current data screen to the remote operator.

In the example shown here, the trigger that set Delay Stop also set reverse-image display and put up the Prompt on line 1.

See FREEZE for more information.



FREEZE



Red FREEZE indicator on the front panel of the COMSTATE I is ON when data display is frozen.

LN=XXXX at upper right of display is buffer line number of first line on the display. (There are 1024 lines in the display buffer.)

Binary expansion of character(s) at cursor position replaces counter-timer display on line 2 (most-significant bit on left; least-significant bit on right).

Cursor arrows move cursor through buffer in any direction. CTRL-UP displays the preceding page of buffer; CTRL-DOWN, the next page. The B key displays the Beginning and the E key the End of the buffer.

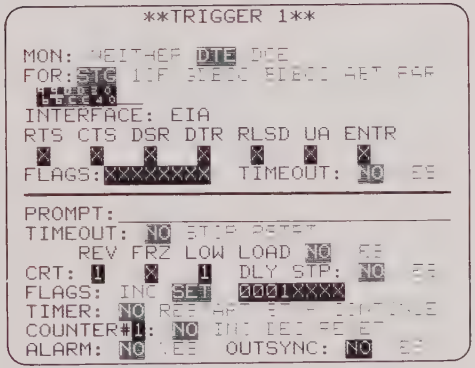
See also DELAY STOP; PROGRAM F; X.25 Trace Display.

HEX is an alternate-action key, which latches ON until it is depressed a second time. The red HEX indicator on the front panel of the COMSTATE I lights while HEX is ON.

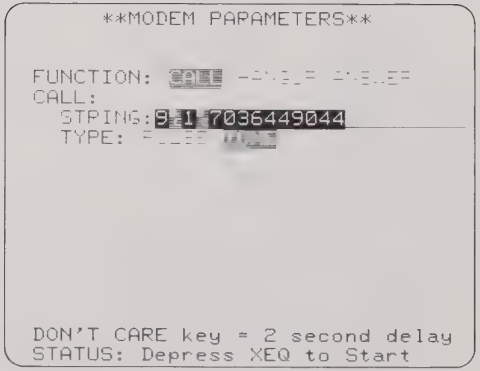
In Program Mode. While HEX is ON, only numerals 0 through 9 and letters A through F are legal keys. (In PROMPT field, HEX is ignored.) Every two consecutive characters are read as one hexadecimal byte.

Characters entered with HEX ON will not be automatically adjusted for the parity selection on the PROGRAM 0 menu.

In Run Mode. Press HEX to convert the data display to hexadecimal. Press CTRL-HEX to convert only control characters to hexadecimal.



MODEM
(OPTION 70)



The Internal Modem card (OPT-932-70-1) and its special telephone-jack interface perform the modem functions and remote-transfer functions normally executed by an external modem in conjunction with the PRINTER/REMOTE interface at the rear of the COMSTATE I.

The modem card is installed in Slot 4 of the Memory Adaptor-Programmer printed-circuit board (OPT-932-20-2).

To connect the COMSTATE I directly to the telephone line, insert the phone-line plug into the RJ-11C jack at the rear of the COMSTATE (near the cover, right of the fan).

The operator directs the activities of the modem by making entries on the Modem Parameters menu screen, Program D.

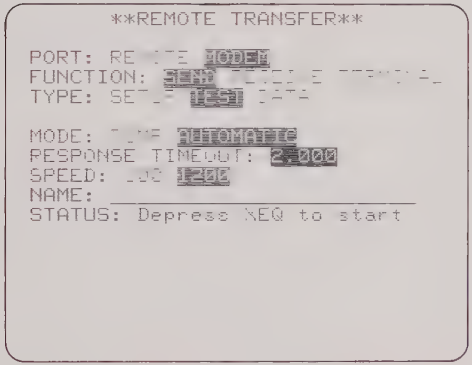
FUNCTION. Place or hang up a call; or answer (send answer tone).

CALL STRING. Enter the called phone number. Use DON'T CARE characters to insert two-second delays in the string.

TYPE. Select TONE or rotary-type PULSE dialing.

If the operator initiates a call on this menu, the data speed of the transmission will be the rate selected on the Remote Transfer menu, Program A.

There are two speeds selectable, 300 and 1200 bps, when MODEM is selected in the PORT field at the top of the Program A screen. If the internal modem answers a call, it allows itself to be trained to the speed (300/1200) of the remote modem. The speed selection on the Program A menu adjusts automatically to the new modem speed.



MODEM (OPTION 70) (cont.)

Once you have established a connection, exit Program D and move to Program A, Remote Transfer. Use the Remote Transfer menu to emulate a terminal or to transfer tests and data to and from a remote INTERVIEW. See PROGRAM A.

To gain control of an unattended remote COMSTATE I or 30B/40B, first select TERMINAL and press XEQ. Then press BREAK. Refer to the attaching sequence outlined under UNATTENDED REMOTE.

If the remote INTERVIEW has an internal modem, it is not necessary for you to use the HANGUP selection. The remote modem will hang up automatically when you send a DETACH command (see UNATTENDED REMOTE). Nor is it necessary to select ANSWER when your phone rings: the internal modem answers the ring automatically. Use ANSWER to convert a call from voice to data.

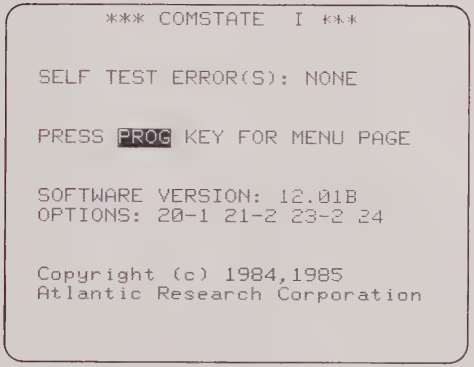
For example, you have plugged both a phone line and a handset into the modular adaptor inserted in the jack at the rear of your unit. You use the handset to place a call. At the answer command, your modem sends an answer tone. The remote modem completes the data-connect handshake by transmitting carrier. To originate carrier yourself, issue a CALL command with blank CALL STRING.

Voltage Selection. Select correct voltage using the card in the Power Connector module on the rear.

Power-up Display. Press POWER switch on rear. Be sure the SELF TEST ERRORS(S) line reads NONE.

SOFTWARE VERSION given on this screen and on PROGRAM menu.

OPTIONS line identifies which options have been installed in the unit.


*** COMSTATE I ***
SELF TEST ERROR(S): NONE
PRESS PROG KEY FOR MENU PAGE
SOFTWARE VERSION: 12.01B
OPTIONS: 20-1 21-2 23-2 24
Copyright (c) 1984,1985
Atlantic Research Corporation

```
**MENU SELECTIONS V12.03 **

0  PROTOCOL SETUP
1  TRIGGERS
2  STATISTICS


5  V.24 INTERFACE CNTL/PRINTER
6  TRANSMIT MODE
7  INTERACTIVE TEST
8  TEST LIBRARY
9  LIBRARY UTILITIES
A  REMOTE TRANSFER
B  BCC PARAMETERS
C  X.21 PROTOCOL CONTROL
D  MODEM PARAMETERS
E  CODE TRANSLATE CHART
F  DATA BUFFER
```

MENU SELECTIONS

Lists all the menus in your unit. Also displays Software Version on line 1. Press key 0 through F for the menu that you want to display.

0 Protocol Setup. May be filled out for monitoring; or default selection, AUTOMON, will cause unit to set up automatically. Must be filled out for testing. Also selects emulate mode and CRT display format, and suppresses or enhances data.

1 Triggers 1-8. For programming operator-prompt messages, counter, timer, alarm, CRT display. May also be used as conditions for Interactive Test.

2 Statistics. Keeps track of four counters and one timer, all under trigger control.

5 V.24 Interface Control/Printer. For controlling RS-232/V.24 leads (for BERT or Interactive Test); selecting printer configuration for printing program menus or data on an ASCII printer.

6 Transmit Mode. Entering messages for Interactive Test; Bit Error Rate Testing (BERT); operating as an asynchronous terminal.

7 Interactive Test. Screens 1 and 2 are alternating selections accessed by CTRL-ENTER. For entering transmission programs and test routines with multiple branches.

8 Test Library. Loading stored tests.

9 Library Utilities. Allows management of the expansion memory (Options 21-2, 22-1, 23-1, 23-2, and 24-1 only): saving, duplicating, and loading tests and data.

A Remote Transfer. Allows you to load setups, tests, or data to or from another COMSTATE I or INTERVIEW 30B/40B; load tests, setups, or data to or from tape storage in a current INTERVIEW 3600/4600 or COMSTATE II; load data into or out of the data buffer of a 3600/4600 or COMSTATE II; or dump to a non-INTERVIEW recording device. Also includes a terminal emulation that controls a remote unattended COMSTATE I or 30B/40B.

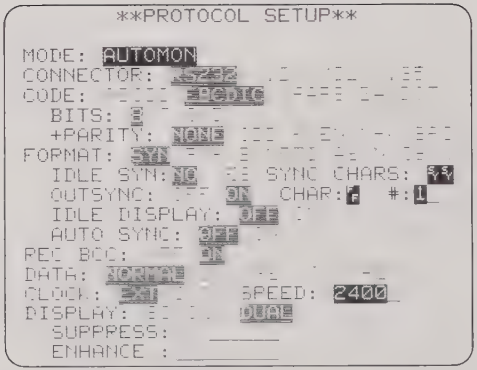
B BCC Parameters. Allows you to alter the parameters of the default block check calculations enabled on PROGRAM 0 and PROGRAM 7 menus.

C X.21 Protocol Control. Controls T, R, C, and I leads in Interactive X.21 operation.

D Modem Parameters. Allows automatic callback during long unattended monitoring run or test.

E Code Translate Chart. Shows hexadecimal-to-character correspondences for code configuration selected on PROGRAM 0 menu.

F Data Buffer. Displays content of the CRT data buffer while COMSTATE I is in Program Mode. Allows remote operator to view test data captured in unattended unit.



PROTOCOL SETUP

AUTMONItor is the default selection in the first field at the top of the Program 0 screen. With the unit connected to a live data interface, simply power the unit on and press PROGRAM, RUN. The unit will analyze the data and configure itself automatically.

After the first monitoring run, press PROGRAM, 0 to call up the Protocal Setup screen. Do any fine tuning to the unit's configuration. With cursor in the MODE field, press the ROLL key to change the selection to MONItor, REANALYZE, or one of the emulate modes. If you keep the AUTOMON selection, the unit will autoconfigure every time it goes into RUN mode.

MODE. To monitor data, connect the unit to the X.21/V.35 or RS-232/V.24 interface with a T-cable and select MONitor. When RUN is depressed, selections on trigger menus (PROGRAM, 1, 1-8) are enabled. If you select TEST DCE or TEST DTE and press RUN, the COMSTATE I will apply appropriate voltages to the interface leads, and all selections on trigger menus and on the Interactive Test menu (PROGRAM 7) will be enabled.

To view the contents of the data buffer running sequentially as though it were live data, select REANALYZE and press RUN.

CONNECTOR. For V.24 or X.21BIS operation, select RS-232. When you select X.21, make the appropriate MODE selection on the X.21 Protocol Control menu, PROGRAM C. V.24/MIL inverts all signals on the data leads, including Idle.

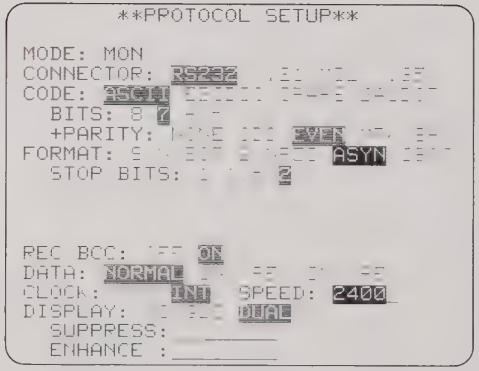
PROGRAM 0 (cont.)

CODE. Select the data transmission code used in the system.

BITS. Select number of information bits in each character.

+PARITY. Select None or one of four parity types. Parity bit is additional to information BITS.

PROGRAM 0
(cont.)



FORMAT. Select SYN for any synchronous protocol, including BISYNC; select BOP for most 7E-framed bit-oriented protocols (HDLC or SDLC); B/NRZI for SDLC/NRZI; ASYN for asynchronous operation with start bit and 1, 1.5, or 2 stop bits; ISOC for asynchronous start-stop data when the interface supplies or requires a bit clock.

The fields on Lines 9 through 12 change, depending on which FORMAT you have selected.

SYNChronous FORMAT

IDLE SYN. Select YES to transmit synchronization characters instead of the normal idle character.

SYNC CHARS. You may enter any one- or two-character synchronization pattern. The default pattern is as follows:

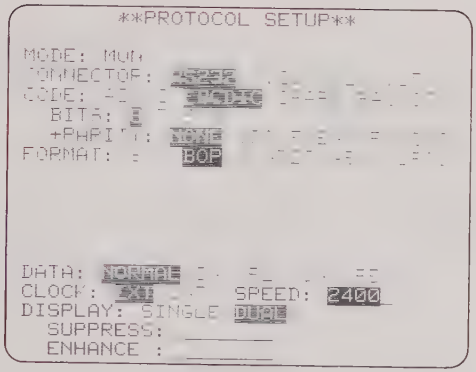
ASCII	16 16 or 96 96 (hex), depending on +PARITY selection
EBCDIC	32 32 (hex)
IPARS	3F 3E (hex) (the only valid sequence for IPARS)
BAUDOT	None

OUTSYNC. Defines the synchronization technique whereby data receivers search for sync characters only while out of synchronization. CHAR: defines the character used by data receivers to go out of sync. #: specifies the number of contiguous characters defined in the CHAR field which will drive the COMSTATE I data receivers out of synchronization.

IDLE DISPLAY. Allows you to see the idle characters between transmissions.

AUTO SYNC. Receivers will resynchronize every time they see the selected synchronization pattern. (AUTO SYNC usually OFF when OUTSYNC: ON is selected.)

REC BCC. For ON, the last character in the received block check is replaced by a low-intensity reverse-image G for Good or bright reverse-image B for Bad. An aborted block (BOP or B/NRZI) is indicated by a bright



reverse-image A. Select nondefault block check parameters on Program B menu.

For OFF, no block check calculations are performed, and all the block check characters actually received are displayed.

PROGRAM 0 (cont.)

BOP or B/NRZI FORMAT

Lines 9 through 12 disappear because synchronization conditions are always defined in bit-oriented protocols. Received Block Check is always ON.

ASYNchronous or ISOC FORMAT

ASYN or ISOC selects asynchronous, start-stop operation.

ISOC should be selected when clock is supplied on the interface. Be sure to select CLOCK: EXT.

STOP BITS. Choose 1, 1.5, or 2.

REC BCC. Same as for Synchronous Format above.

System Characteristics

DATA.

DATA Selection	Logic M (1)	Logic S (0)	Least Sig. Bit	Idle
NORMAL	-12V	+12V	First	-12V
INV	+12V	-12V	First	-12V
REV	-12V	+12V	Last	-12V
INV/REV	+12V	-12V	Last	-12V

CLOCK. Choose EXT if clock will be supplied on the interface; otherwise, use INT.

SPEED. If INTernal clock is selected, a SPEED must be entered. Use up to five digits, or four digits and a decimal point. Maximum for internal clock is 28800 bps.

Data Display Control

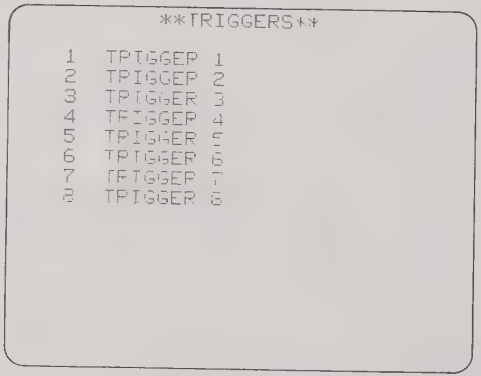
(In Automonitor mode, selections in the following fields do not change automatically.)

SINGLE-Line Display. DTE and DCE data on same line. DCE data is always underlined.

DUAL-Line Display. DTE data is displayed on first line; then DCE data (underlined because it comes from the line) on the second, and so on. Fill symbols mantain time correlation between the two leads to within ±1 character.

SUPPRESS. Suppresses alphanumeric or hexadecimal characters, Not Equal characters, or characters matching a Bit Mask, from the display.

ENHANCE. Displays characters in bright reverse image. Types of character are same as for Suppress.



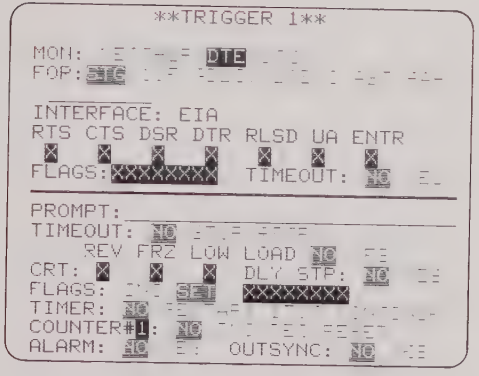
TRIGGERS

To display any trigger menu, press PROGRAM, 1, to bring up the Triggers screen, and then press the trigger's identification number.

Trigger Conditions

MONitor. If you select DTE or DCE, the COMSTATE 1 looks for the event selected on line 4--

- STR: The exact string of characters entered on line 5.
- 1 OF: Any character from the list entered on line 5.
- GDBCC: A good block check.
- BDBCC: A bad block check.
- ABT: An aborted block (BOP or B/NRZI).
- PAR: A parity error.



PROGRAM 1 (cont.)

Character-Entry Field (line 5). Enter a character string or "10F" list. Any of the following may be used: alphanumeric characters; control characters; hexadecimal characters; DON'T CARE characters; BOP FLAGs; one BIT MASK; ≠ key ("not equal to" key, used preceding BIT MASK, BOP FLAGs, and alphanumeric, control, and HEX characters).

INTERFACE: When one interface condition is selected, looks for the transition. When more than one condition is selected looks for interface status.

UA is the user-assigned input pin on the interface panel. There is a glitch catcher on the UA input. Any voltage greater than +3 V or less than -3 V for more than 1 microsecond can be sensed by a UA trigger condition. (See Technical Manual for X.21 voltages.)

ENTR=1 is depression of the ENTER key.

In the interface leads fields, 0, 1, and X (DON'T CARE) are legal. When you monitor X.21 leads, a "0" in the box under the lead indicates ON (or plus voltage). But for RS-232 or V.35, "1" indicates ON.

FLAGS. Trigger looks at flag-counter for pattern of 1's, 0's, and X's (DON'T CAREs) entered here. When condition is used alone, trigger looks for TRANSITION to this flag-pattern. When used in conjunction with other conditions, trigger monitors flag status, not transition. (These are program-control flags, not related to BOP framing flags.)

TIMEOUT. Looks for expiration of the special timeout timer.

Trigger Actions

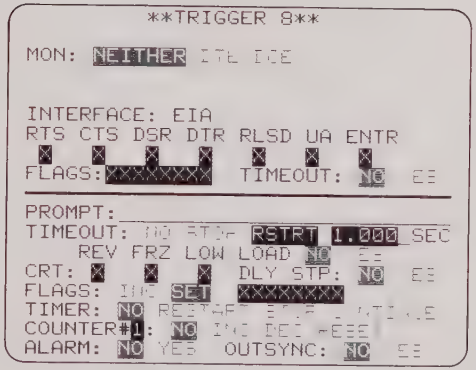
PROMPT. Enter message to operator of up to 25 characters. Will be displayed on line 1.

LOAD. Loads a test program or setup automatically from the expansion memory, then enters Run mode. Entry is a 3-digit ID number that combines the Slot and Record designations described under Program 8.

TIMEOUT. Restarts or stops the timeout timer. Timer is also a rotating WAIT FOR selection on PROGRAM 7 menu. Maximum time is 65.53 seconds (or 280 minutes, per state, when programmed with flags: see Tech Manual, 19.5.e).

CRT. Enter 1 for ON, 0 for OFF.

REV = reverse image.



FRZ freezes display. Only triggers can turn trigger freeze off. Only one screen of data can be inspected in trigger freeze.

LOW = low intensity.

PROGRAM 1 (cont.)

DLY STOP. Freezes display buffer after 256 more characters have been added to buffer. Entire buffer can be inspected. Triggers cannot turn Delay Stop off. See also FREEZE.

FLAGS. These are program-control flags; not related to BOP framing flags.

INCrement. The eight flags are treated as a binary number which is incremented by 1 each time conditions are true. (Lowest-order bit is rightmost bit.)

SET. Sets any of the flags ON or OFF when X is overwritten with a 1 or 0.

TIMER. Statistical timer is displayed on line 1 in Run Mode. It will RESTART, STOP, or CONTINUE from last value.

COUNTER. Default Counter number is 1. Numbers 1 through 4 are legal. Move the cursor to this field and overwrite the 1. INCrement or DECrement by 1's, or RESET. Counter readings are displayed during Freeze or Program mode on Program 2 Statistics screen. During real-time data display (Run mode), press 1-4 to read counter.

ALARM. Sounds audible "chirp."

OUTSYNC. Forces receiver out of synchronization on side of line monitored in condition.

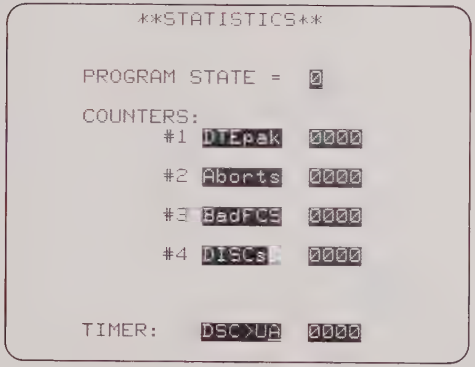
STATISTICS

The statistics menu screen keeps track of four counters and one timer, all under trigger control.

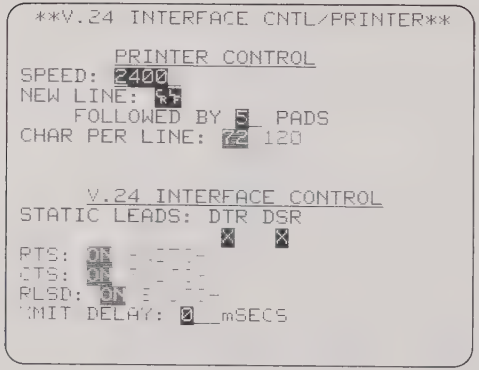
PROGRAM STATE. Indicates state the program had attained when Run mode was exited.

COUNTERS. ASCII-character legend fields in which only alphanumeric keyboard characters or control character mnemonics (NULL or STX, for example) may be used. Counter readings are displayed during Program mode. During real-time data display (Run mode), press 1-4 to display each counter legend and value.

TIMER. ASCII-character legend field. Timer value displayed in Program mode and Run mode.



PROGRAM 5



V.24 INTERFACE CONTROL

TEST MODE. Select TEST DCE or TEST DTE on PROGRAM 0 menu.

STATIC LEADS. For the lead controlled by the COMSTATE 1 (see Table), enter 1 for ON or 0 for OFF. For X, the lead is always ON.

Full-Duplex Systems

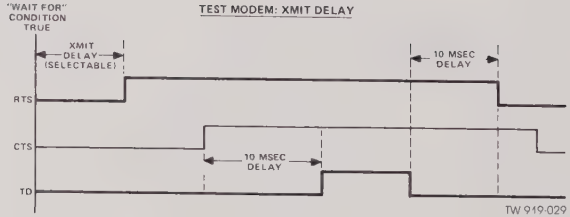
RTS ON, Test Modem Mode. COMSTATE 1 transmits as soon as test conditions are satisfied (provided that CTS ON is supplied by external source).

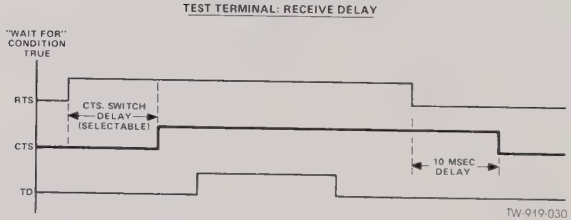
RLSD ON, Test Terminal Mode. COMSTATE 1 transmits as soon as test conditions are satisfied.

XMIT DELAY. Use this field to enter a delay from time test conditions are satisfied to transmission of first message character.

COMSTATE 1 RS-232/V.24/V.35 HANDSHAKING CONTROL

Lead		TEST DTE Mode		TEST DCE Mode	
Pin	Name	Controls	Looks for	Controls	Looks for
Static Leads					
20	DTR	N	Y	Y	N
6	DSR	Y	N	N	Y
Switched Leads					
4	RTS	N	Y	Y	N
5	CTS	Y	N	N	Y
8	RLSD	Y	N	N	Y





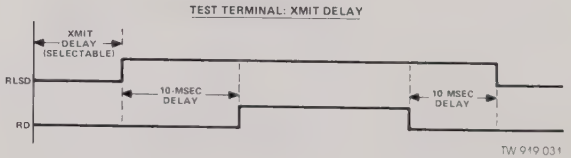


Figure 1. Delay times for RS-232/V.24 leads controlled by the COMSTATE I in its Test Modes. Heavy lines denote leads controlled by the COMSTATE I; lighter lines indicate the opposite side of the interface. XMIT DELAY is selected in the XMIT DELAY field of the Interface Control menu (Program 5); CTS:SWITCH DELAY, on the CTS line of that menu.

Half-Duplex or Multidrop Systems

See the handshaking diagram (Figure 1) for COMSTATE 1 handshaking sequence and delay times.

In half-duplex operation, select SWITCHED for RTS, CTS, and RLSD.

In multidrop systems, selections depend on which side of the communication link you are on. If you are testing the host DTE, select CTS: ON and RLSD: SWITCHED. (You do not control RTS.) If you are testing a drop DTE, select CTS: SWITCHED and RLSD: ON.

If you are emulating the host, testing DCE, select RTS: ON. (CTS and RLSD are not under your control.) If you are testing DCE from the drop side of the line, select RTS: SWITCHED.

PROGRAM 5
(cont.)

```
ASCII/7/ODD/SYNC/16 16
 pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd
 pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd

 pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd
 pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd

 pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd si nu nu nu nu nu nu nu
 pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd 7

 nu nu nu nu nu nu nu nu nu nu nu eq sy 1  2  3  1  2  3  +  pd pd pd pd pd pd pd pd pd pd pd
...+  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  k  pd pd pd pd pd

 sx sp _ T H I S _ I S _ A _ P R I N T O U T _ O F _ A _ D T E _ C
.....

 A L L I N G _ S E Q U E N C E _ A N D _ D A T A _ X F E R _ I N
.....

 _  X  .  2  1  .  _  sp ex:G -pd.....
.....sx sp _ T H E _ D C E _ W I L L _ I N I T I A
.....pd pd... pd pd pd pd pd pd ex nu nu nu nu nu nu
 T E _ A _ C L E A R . _  sp ex:G -pd nu nu nu nu nu nu nu nu nu nu nu nu nu nu nu nu nu nu

 nu nu nu nu nu nu nu nu nu nu nu p  pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd
 nu nu nu pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd

 pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd
 pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd pd

 pd pd pd pd pd pd pd pd pd pd pd pd
 pd pd pd pd pd pd pd pd pd pd pd pd
```

Figure 2

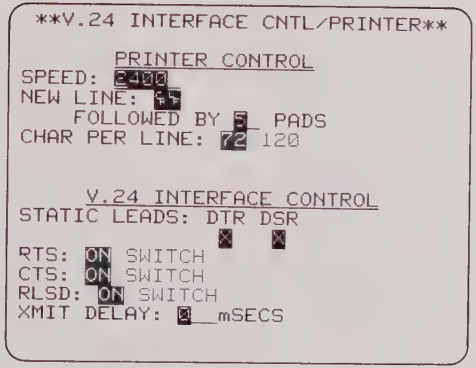
PRINTER CONTROL

The COMSTATE I transmits to an ASCII printer on pin 3 of the RS-232/V.24 PRINTER/REMOTE connector; also drives CTS, DSR, and RLSD to +12 V. Stops transmitting when DTR goes off (-12 V); resumes when DTR goes on (+12 V). Transmits 7 data bits with even parity.

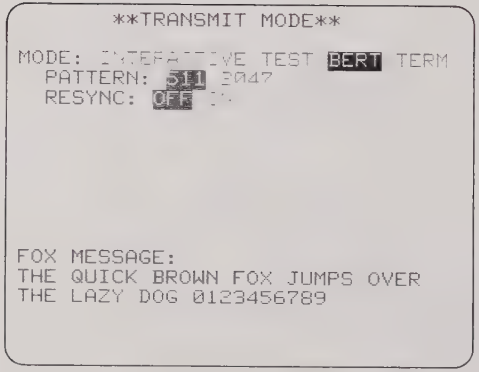
SPEED. In BPS. Maximum of 5 digits (or four digits and a decimal point). Maximum speed is 19200 bps.

NEW LINE. Enter carriage-return character(s) needed by the printer; also the number of pad characters that the carriage-return mechanism requires before it is ready to begin printing on a new line.

CHARACTERS PER LINE. Maximum number of characters per line. Select either 72 or 120.



PRINT. Press PRINT while menu or frozen data buffer page is displayed; or SHIFT/CTRL-PRINT to print entire data buffer. (See Figure 2.)



TRANSMIT MODE: BERT

Program Mode

On the PROGRAM 0 menu, select TEST DCE or TEST DTE; SYNC, ASYNC, or ISOC; number of information BITS (8, 7, 6, or 5); +PARITY (NONE for SYNC; NONE, EVEN, or ODD for ASYNC or ISOC); and CLOCK:EXT or INT. Then fill out BERT menu.

Introduce errors into the BERT transmission with the DON'T CARE key. One errored bit will be sent each time DON'T CARE is depressed.

PATTERN. Choose 511- or 2047-bit pattern.

RESYNC. Receiver will resynchronize every time a FAULT is found.

(For BERT self-test, select TEST DTE and use the front-panel breakout box to tie TD to RD.)

Run Mode

TEST SECONDS. Counter increments for every second the test runs.

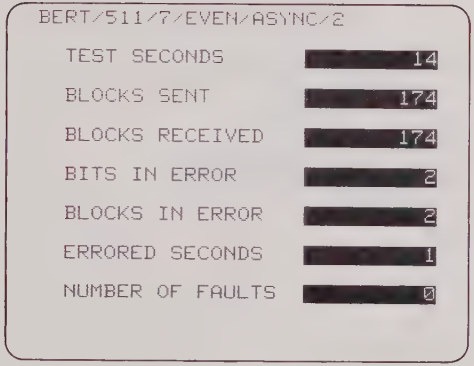
BLOCKS SENT. Number of 1000-bit blocks sent.

BLOCKS RECEIVED. Number of 1000-bit blocks received.

BITS IN ERROR. Number of received bits that do not match expected pattern.

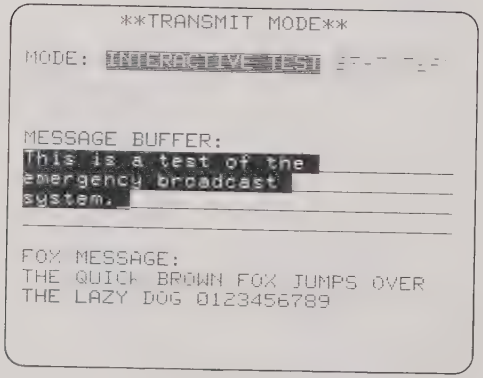
BLOCKS IN ERROR. Number of blocks in which one or more bit errors have occurred.

ERRORED SECONDS. Number of 1-second periods in which errors have been found.



NUMBER OF FAULTS. An error has been detected in over 25% of bits received over a period of time (approximately 64 bit errors in 256 contiguous bits). RESYNC should be ON for meaningful FAULT readings.

PROGRAM 6
(cont.)



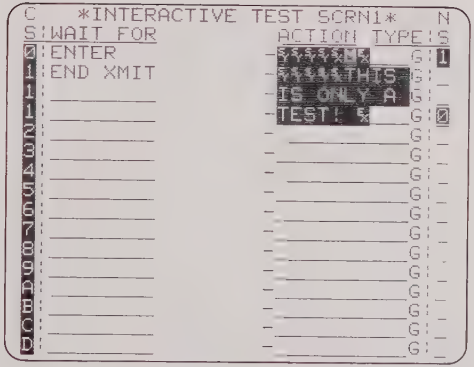
TRANSMIT MODE: INTERACTIVE TEST

Enter message of up to 128 characters into message buffer. Alphanumeric, control, and hexadecimal characters are legal.

CLEAR key clears line where cursor is; CTRL-CLEAR clears entire message buffer.

Then use BIT MASK MSG key to specify this message in XMIT field of PROGRAM 7 (Interactive Test) menu.

To send the standard Fox message, use FLAG FOX key in XMIT field of PROGRAM 7 menu.



PROGRAM 6
(cont.)

```
ASCII/7/SPACE/ASYNC/2          TERM
 CNTR1 _____=0000   TIMER=0000
  247      \right2
  248      PROGRAM 6
  249      (cont.)
  250
  251      \center1
  252      TRANSMIT MODE: TERMINA
L
  253
  254      Operate as an asynchro
nous terminal.
  255          Use front-panel int
erface.
  256      On PROGRAM 0
  257      menu, select MODE: TES
T DCE and FORMAT: ASYN.
/
```

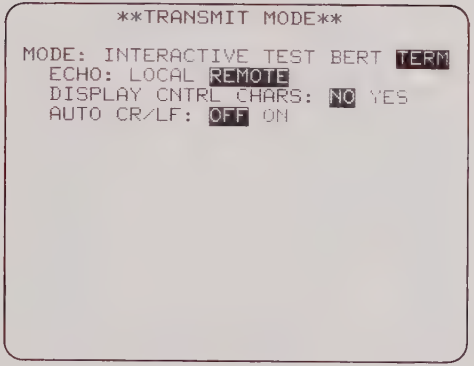
TRANSMIT MODE: TERMINAL

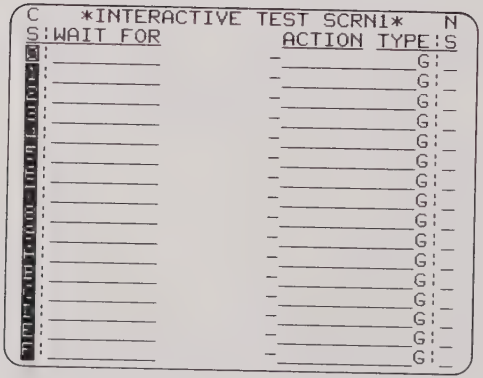
Operate as an asynchronous terminal. Use front-panel interface. On PROGRAM 0 menu, select MODE: TEST DCE and FORMAT: ASYN. All other selections are valid, including Suppress and Enhance. Interactive Test menu (PROGRAM 7) is disabled.

ECHO. Select REMOTE if host is returning an echo.

DISPLAY CONTROL CHARACTERS. YES will display carriage returns and other control characters.

AUTO CR/LF. The unit will perform a line feed (not generate a line-feed character) whenever you send or receive a CR. If you are displaying control characters, this should be ON.





INTERACTIVE TEST

Test Screens 1 and 2

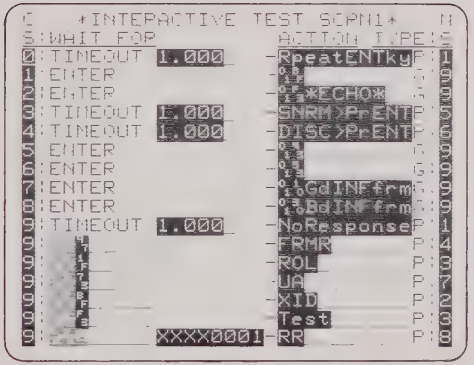
The two screens make 32 steps available. Press CTRL-ENTER to go from one screen to the other.

To move the cursor from field to field on either screen, use the ENTER key. To move back one field, use the LEFT cursor arrow key. To move up and down the menu, use the cursor UP and DOWN keys.

CURRENT STATE (CS) Column

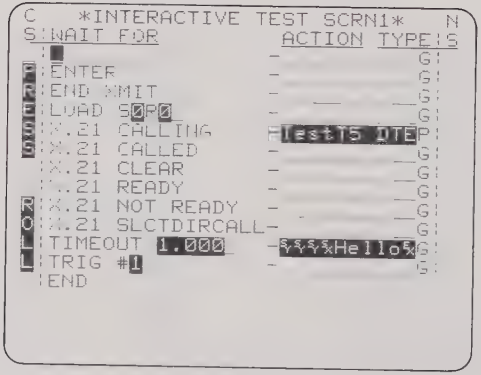
A state is a condition of waiting for particular inputs which, once received, result in particular outputs. Tests on COMSTATE I's interactive screens move from state to state. With entries in the CURRENT STATE and NEXT STATE columns, you control this movement.

State-to-state movement allows you to test for multiple conditions at a given time, and to create multiple branches. For example, look at the SDLC link-level test on this page. In one cycle of this test, the test will enter State 9 six different times. When the test leaves State 9, it can go in six different directions. Each time the test is in this state, it is in readiness for a whole range of inputs.



Valid entries in the CS column are 0 through V, for a maximum 32 states. The states need not be entered sequentially, but the steps within a state, wherever that state is placed on the screen, must be contiguous.

PROGRAM 7
(cont.)



WAIT FOR Column

With the ROLL key you can call up seven revolving selections (or thirteen selections when you have selected X.21 Mode on the PROGRAM C menu):

STRING (Blank Field). Enter a character string, or leave blank for a triggerless action. Legal string characters are alphanumeric, control, and hexadecimal characters, 7E Flags, Not Equals (≠), Don't Cares, and one Bit Mask.

ENTER. ENTER key will trigger action.

END XMIT. The condition will be true as soon as the unit has completed the preceding XMIT action. (This can be used to prevent overloads at the Xmit buffer queues.)

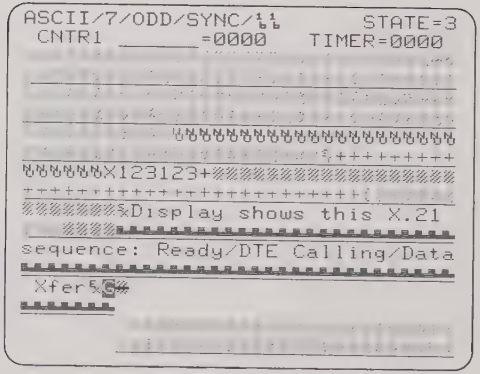
LOAD. Load a test program or setup from the Test Library. See PROGRAM 8 and PROGRAM 9. Enter the Slot (S) and Record (R) designations used in the Test Library directory. (First ID digit is Slot, second and third digits are Record.)

END. Succeeding selections, if any, become dormant. (Any queued transmissions are canceled when test arrives at END.)

TIMEOUT. Starts timeout timer as soon as state is entered. Timeout is then the condition for next action.

TRIG #1. When Trigger 1 condition is true, the next ACTION (including "go to Next State") will occur. To substitute other triggers, write over TRIG "1" with a number from 2 through 8.

PROGRAM 7
(cont.)



X.21 CALLING. COMSTATE 1 executes one side (DTE or DCE, depending on PROGRAM 0 test mode) of the DTE Calling sequence. This WAIT FOR condition will be true when Ready for Data state (1, ON, 1, ON) is reached.

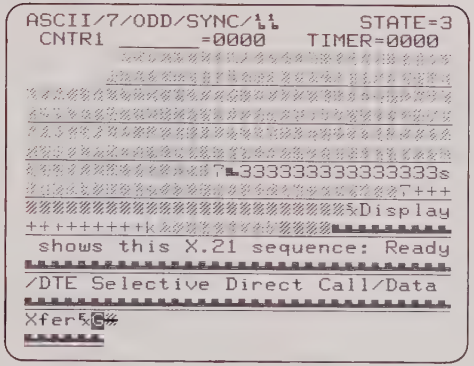
X.21 CALLED. Unit executes one side of the DTE Called state. Condition is true when Ready for Data state (1, ON, 1, ON) is reached.

X.21 CLEAR. Unit executes one side of the standard X.21 clearing sequence. Condition is satisfied when Ready state is reached.

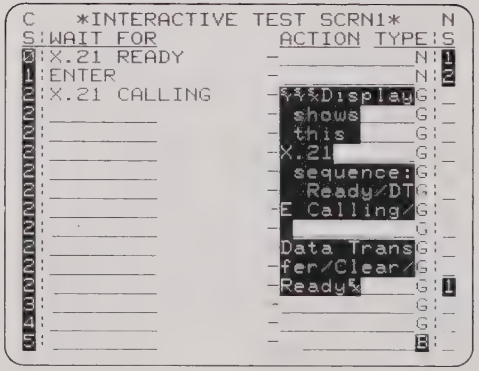
X.21 READY. Unit enters the Ready state. Condition is true immediately. To hold the test in this state, follow this WAIT FOR selection with a TIMEOUT entry.

X.21 NOT READY. Unit enters the NOT READY state by transmitting T or R = 0, C or I = off (low-intensity NULLs on the COMSTATE I data display). The condition comes true immediately.

X.21 SELECTIVE DIRECT CALL. Same as DTE Calling, except that in TEST DCE mode the unit sends a Selective Direct Call signal in place of the usual call request of T=0, C=ON (full-intensity NULLs on the display). See accompanying figure. Select the SDC signal on the PROGRAM C menu.



PROGRAM 7
(cont.)



ACTION Column

Enter up to 10 protocol and message characters, including alphanumeric, control, or hexadecimal characters, Fox message, and Message Buffer (see PROGRAM 6). To enter a Fox message in this field, use the FLAG FOX key; to enter the contents of the Message Buffer, use the BIT MASK MSG key; either message may be repeated.

If a WAIT FOR line is left blank, consecutive XMIT messages will join together without intermediate handshaking. See accompanying figure.

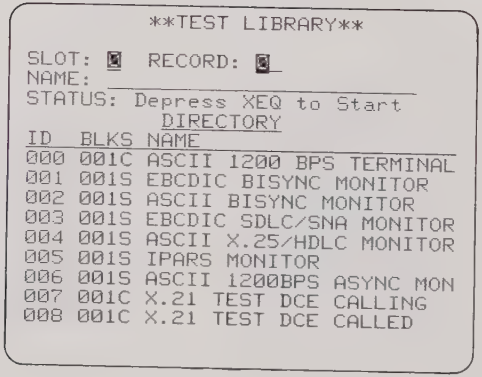
TYPE Column

There are four revolving selections, obtained by the ROLL key -- Good or Bad BCC, No BCC, and Prompt. "P" (Prompt) displays your ACTION field entry as a message to the operator on line 1. This message is not transmitted.

To send an Abort with BOP or B/NRZI selected, choose "N" (No) to accompany a text field at least two characters long.

Inserting and Deleting Lines and Characters

To insert a new line above the cursor, press CTRL-DOWN or SHIFT-DOWN. To delete a line at the cursor, press CTRL/SHIFT-UP. To insert a space in front of the cursor-character, press CTRL-RIGHT or SHIFT-RIGHT. To delete a character at the cursor position, press CTRL/SHIFT-LEFT. Repeat to erase half of a string (for example).


TEST LIBRARY
SLOT: 0 RECORD: 00
NAME:
STATUS: Depress XEQ to Start
DIRECTORY
ID BLKS NAME
000 001C ASCII 1200 BPS TERMINAL
001 001S EBCDIC BISYNC MONITOR
002 001S ASCII BISYNC MONITOR
003 001S EBCDIC SDLC/SNA MONITOR
004 001S ASCII X.25/HDLC MONITOR
005 001S IPARS MONITOR
006 001S ASCII 1200BPS ASYNC MON
007 001C X.21 TEST DCE CALLING
008 001C X.21 TEST DCE CALLED

TEST LIBRARY

If the COMSTATE I has expansion memory Option 21, 22, 23, or 24, you can use this menu to LOAD Setups, Tests, or Data from the expansion memory.

In COMSTATE I's without memory options, only the nine factory-stored setups (including two X.21 interactive tests) in internal memory can be loaded.

For the SLOT number on line 3, enter the first digit of the Directory ID number; for the RECORD number, use the second and third digits of the ID number. Press XEQ to LOAD.

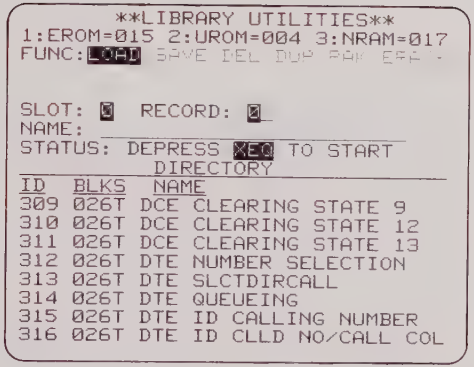
See also PROGRAM 9.

Directory. Use SHIFT-UP or SHIFT-DOWN (or CTRL-UP/DOWN) to see the Directory, page by page.

ID Number. First digit is number of SLOT on Adapter-Programmer board; second and third digits are RECORD number assigned by COMSTATE I.

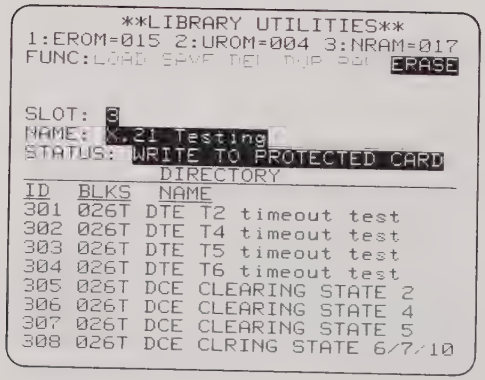
BLKS. The three digits are the number of blocks in a record. S = Setup (PROGRAM 0 configuration); T = Test (all program menus); D = Data (saved from Data Buffer); C = canned test, occupying one memory block in slot 0.

Line 1, Memory Status. For each slot in expansion memory, shows type of memory card and number of blocks available for writing.


LIBRARY UTILITIES
1:EROM=015 2:UROM=004 3:NRAM=017
FUNC: LOAD SAVE DEL DUP RAN ERA
SLOT: 0 RECORD: 0
NAME:
STATUS: DEPRESS XEQ TO START
DIRECTORY
ID BLKS NAME
309 026T DCE CLEARING STATE 9
310 026T DCE CLEARING STATE 12
311 026T DCE CLEARING STATE 13
312 026T DTE NUMBER SELECTION
313 026T DTE SLCTDIRCALL
314 026T DTE QUEUEING
315 026T DTE ID CALLING NUMBER
316 026T DTE ID CLLD NO/CALL COL

UROM = ultraviolet-erasable ROM (Option 21, 64k: to erase UROM, each card must be removed and placed in UV-erasing equipment);
VRAM = volatile random-access memory (Option 22, 16k: quickly erasable in unit, but memory not kept when unit is turned off);

PROGRAM 9
(cont.)


LIBRARY UTILITIES
1:EROM=015 2:UROM=004 3:NRAM=017
FUNC: ERASE
SLOT: 3
NAME: X.21 Testing
STATUS: WRITE TO PROTECTED CARD
DIRECTORY
ID BLKS NAME
301 026T DTE T2 timeout test
302 026T DTE T4 timeout test
303 026T DTE T5 timeout test
304 026T DTE T6 timeout test
305 026T DCE CLEARING STATE 2
306 026T DCE CLEARING STATE 4
307 026T DCE CLEARING STATE 5
308 026T DCE CLRING STATE 6/7/10

NRAM = nonvolatile RAM (Option 23, 16k or 64k: memory is not erased when unit powers down);
EROM = electrically erasable ROM (Option 24, 16k: can be erased in the COMSTATE I memory, but is not erased when unit powers down.)

Line 2, FUNCtions.

LOAD. To load any record listed in the Directory, enter the Slot and Record number on line 6; then press XEQ key.

SAVE. Select Type of material to be saved on line 4; and Slot number of memory card on line 6. To save data, also enter "FROM" and "TO" buffer line numbers on line 5. Then, enter a Name on line 7 and press XEQ. The record will be saved at the next available memory location and the name will be entered in the Directory.

DELete. Select Slot and Record number of directory entry to be deleted. Press XEQ. Entry will be DELeted from the Directory, and memory will be flagged at the record location.

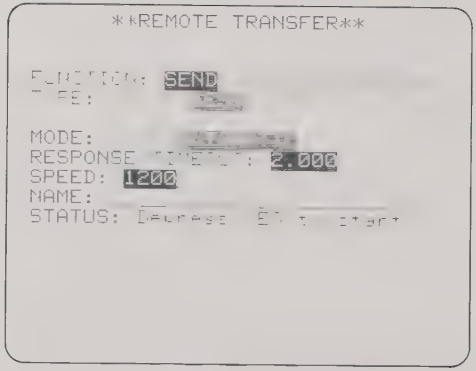
DUPlicate. To copy a memory card to a blank, nonwrite-protected card, enter "FROM" and "TO" slot numbers on line 5, and press XEQ. Destination card must be at least as large as source card.

PAcK. PAcKing a card makes the unused space resulting from Deletions or aborted Saves available. Enter card Slot number in both "FROM" and "TO" fields. A RAM or EROM card may be packed to itself.

When a card is PAcKed to another card, as many records as possible will be packed on the "TO" card, but records already on the "TO" card will not be erased.

ERASE. Select Slot of card to be erased. UROM and write-protected cards cannot be erased.

Note: When cards are write-protected, only the LOAD function will be carried out.



REMOTE TRANSFER

Interface and Handshaking

The PRINTER/REMOTE connector appears as a modem. DSR and RLSD are driven to 12 V. The COMSTATE 1 sends on Pin 3 and expects to receive on Pin 2.

With the INTERVIEW-to-Modem cable connected to the PRINTER/REMOTE connector, the interface appears as a terminal: DTR appears constantly on. When XEQ is pressed, RTS is turned on; when CTS is received, the transmission appears on TD.

Uploading and Downloading to Another INTERVIEW

To transfer a Setup, Test, or Data between INTERVIEWs without modems, connect their PRINTER/REMOTE connectors with the special INTERVIEW-to-INTERVIEW cable.

On the Sending unit, select FUNCTION:SEND, TYPE, and MODE:AUTOMATIC. Fill in the buffer line range if you are sending data. Enter any SPEED up to 9600 (bps). NAME the transmission.

The sending INTERVIEW requests and waits for acknowledgments (ACK0 and ACK1) during the transmission. If no acknowledgment is received within a prescribed time, a response timer times out and the sender transmits an ENQ. After five consecutive ENQs without acknowledgment, the sender aborts the session. This REPONSE TIMEOUT is selected on the sender's Program A menu.

On the Receiving unit, select FUNCTION:RECEIVE, MODE:AUTOMATIC, and enter the same SPEED as on the sending unit.

To start the transfer, press XEQ on each unit.

To transfer between units through modems, connect each INTERVIEW to its modem with the special INTERVIEW-to-Modem cable. Attach the connector labeled "INTERVIEW" to the printer/remote port.

PROGRAM A
(cont.)

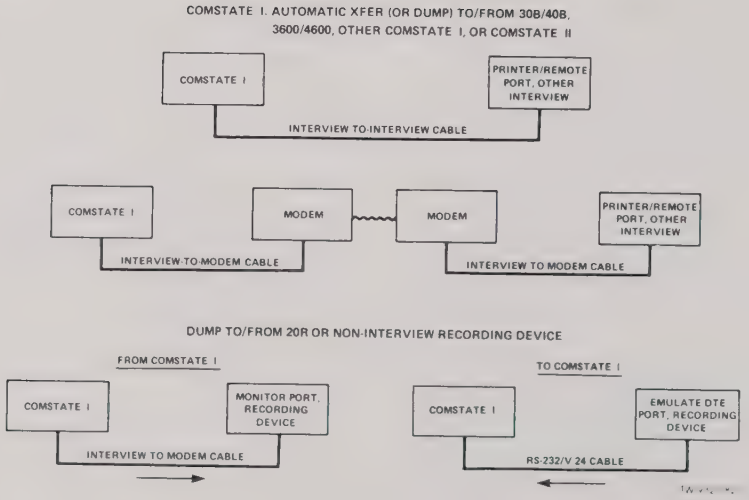


Figure 3

Dumping to a Recording Device

When DUMP is selected, the COMSTATE I transmits immediately without waiting for handshaking or requesting acknowledgments.

Connect the recording device to the PRINTER/REMOTE interface with the INTERVIEW-to-Modem cable, just as in "Downloading." Select MODE:DUMP. RESPONSE TIMEOUT controls data flow by inserting a pause between block transmissions. Other menu selections are the same as for AUTOMATIC operation. The SPEED selected must match that of the recording device.

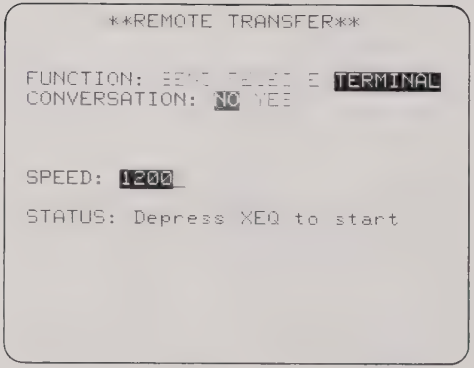
Note: The first byte of the record header must be recorded; otherwise the COMSTATE I will not be able to use the record when it is dumped back to it.

Dumping from a Recording Device

Connect the recording device to the PRINTER/REMOTE interface on the COMSTATE I with a standard RS-232 cable. Before you start the recording device, press the XEQ key.

Note: If the COMSTATE I receives any data before the first byte of the record header, it will not be able to use the record.

PROGRAM A
(cont.)



Terminal Mode. The Remote Transfer (Program A) screen has a terminal mode different from the terminal emulation selected on Program 6.

Use this terminal mode to control a remote unattended COMSTATE I or INTERVIEW 30B/40B. Select TERMINAL, then press XEQ.

See also MODEM; TERMINAL; UNATTENDED REMOTE.

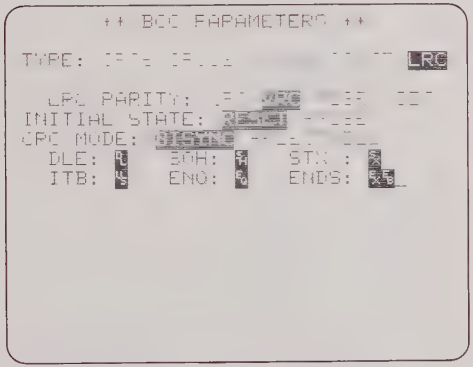
BCC PARAMETERS

The COMSTATE I performs block check calculations on received and transmitted data.

Block check calculations on data on pins 2 and 3 are enabled in the REC BCC: field on the PROGRAM 0 menu. Block check characters appended to transmitted data are enabled in the TYPE column on the PROGRAM 7 menu. For character-oriented protocols, you can set the parameters for these calculations on the BCC Parameters menu, PROGRAM B.

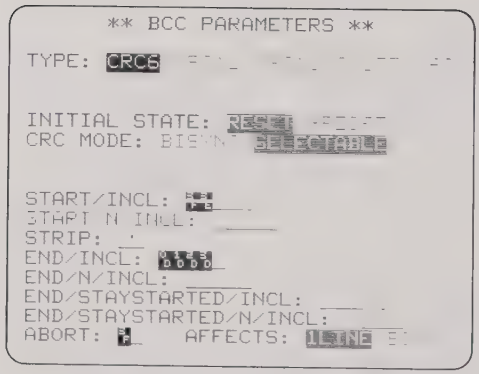
The unit defaults automatically to specific standard block check calculations depending on the code and format selections made on the Protocol Setup menu.

The BCC Parameters menu shown is the default menu for ASCII code in SYNC or ASYNC format.



Note that the BISYNC selection in the CRC MODE: field allows you to specify the values associated with various control functions, or to omit these functions by clearing their menu fields.

PROGRAM B
(cont.)



In SELECTABLE CRC mode, you may define control characters and specify whether they are included in or excluded from the BCC calculation. The accompanying figure is the default PROGRAM B menu when you select IPARS on PROGRAM 0.

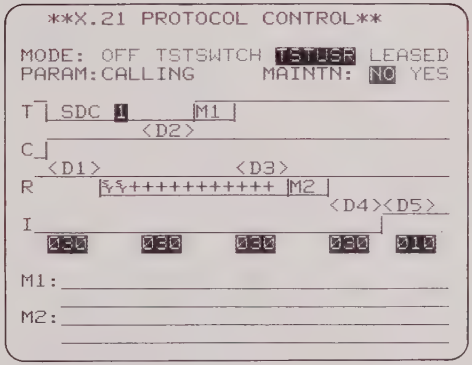
X.21 PROTOCOL CONTROL

(See also PROGRAM 7 and X.21 Operation)

Default MODE is OFF (RS-232/V.24/V.35 mode). For X.21 operation, select TSTSWTCH or TSTUSR. Select LEASED mode for X.21 operation over a leased line.

If you are a DTE at one site, then you are testing the other site. For example, if you are a DTE at a user site (with TEST DCE selected on Program 0), select TSTSWTCH.

If you are a DCE at one site, then you are testing the same site. For example, if you are a DCE at a user site (with TEST DTE selected on Program 0), select TSTUSR.



PROGRAM C
(cont.)

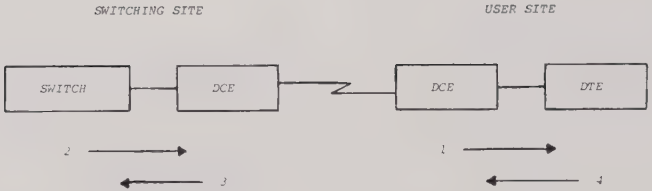

SWITCHING SITE
USER SITE
SWITCH
DCE
DCE
DTE
2
3
1
4
(1) TEST DTE, TSTUSR, xmit DCE-type protocol (++'s, BELLs, etc.) on R, control I.
(2) TEST DCE, TSTUSR, xmit DCE-type protocol (++'s, BELLs, etc.) on T, control C.
(3) TEST DTE, TSTSWTCH, xmit DTE-type protocol (NULLs, M1, etc.) on R, control I.
(4) TEST DCE, TSTSWTCH, xmit DTE-type protocol (NULLs, M1, etc.) on T, control C.
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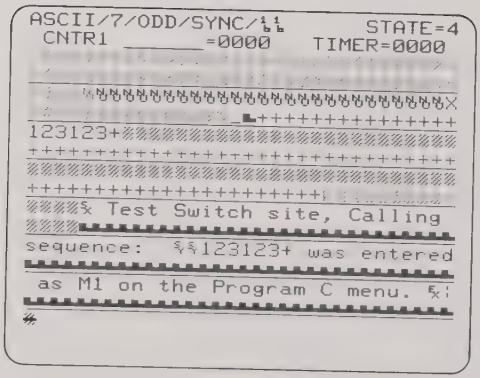
Figure 4. Test Modes selected on COMSTATE 1 for each of its X.21 leased-line testing roles.

TSTSWTCH and TSTUSR

There are five different sets of timing parameters in TSTSWTCH and TSTUSR mode, each with its own PROGRAM C menu display. To select one of the rotating displays, move the cursor to the PARAM: field and press ROLL.

The parameters are always named from the user site's point of view. CALLING, for example, means User Site Calling. When the switching site initiates a call, the parameter is CALLED. (The standard X.21 literature refers to the user site as "DTE," and the switching site as "DCE.")

PROGRAM C
(cont.)

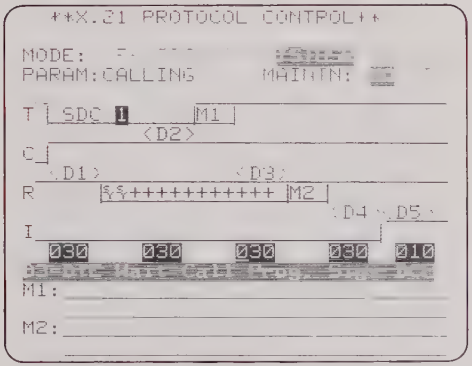


CALLING. In the Calling sequence, the user site controls M1, while the network controls M2. These are coded character strings. M1 is the user's Selection Signal, the address ("phone number") it is trying to reach. See figure.

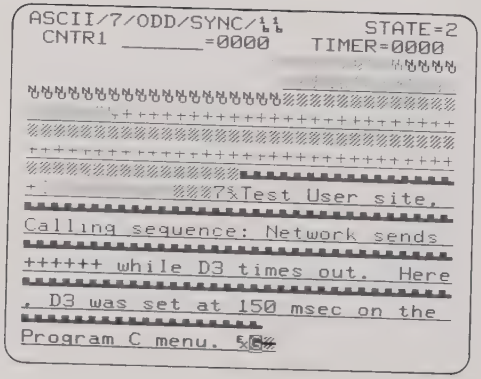
If you are in TEST DCE (PROGRAM 0) and TSTSWTCH (PROGRAM C) modes, you can send an M1 string by making an entry on line 16 of the PROGRAM C menu, along with an X.21 CALLING entry on the PROGRAM 7 menu.

When it is in TSTSWTCH mode, the COMSTATE I also controls the Selective Direct Call (SDC) field on the PROGRAM C menu. If your destination address is an SDC number, dial that number (1 through 9) in the SDC field. See PROGRAM 7 for the enabling entry on the interactive test menu.

Selections on the PROGRAM C menu also determine how long the COMSTATE I remains in each state in the various X.21 sequences. When you display the CALLING sequence on the PROGRAM C menu, you may access five separate delay times, four of them controlled by the switching site (that is, by the unit when it is in TEST DTE, TSTUSR mode). The delay fields, with various default values, are below the timing display. As you move the cursor into one of these fields, the transition being controlled is displayed on line 14.



PROGRAM C
(cont.)



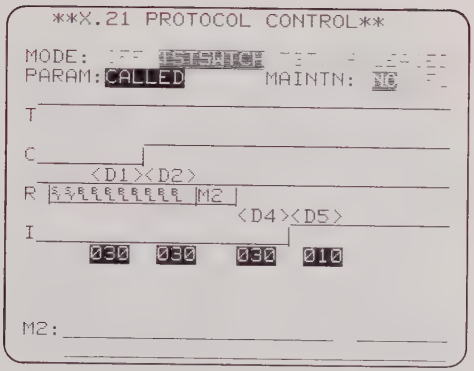
For example, Delay #3 (D3) represents the time that the network remains in Proceed to Select state, sending a string of plus-characters (+) even after the user has responded with selection signals. See figure. Default is 30 milliseconds, but you can substitute any delay time up to 65 seconds.

Milliseconds is the default time-measurement in the delay-time fields. The entry for three seconds would be 3s.

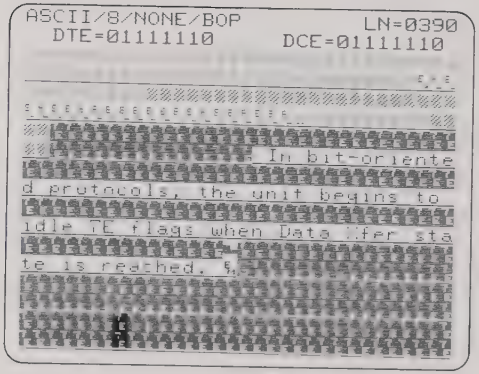
CALLED. The user site (or the unit in TEST DCE, TSTSWTCH mode) controls D1. The switching site (or the unit in TEST DTE, TSTUSR mode) controls M2, D2, D4, and D5.

M2 is DCE Provided Information. If you are in TSTUSR mode (whether you are DTE or DCE) and you have selected X.21 CALLED on the Interactive Test screen, you may enter any M2 information at the bottom of the PROGRAM C menu.

D2 is the delay between receipt of the Call Accepted signal and transmission of DCE Provided Information.



PROGRAM C
(cont.)

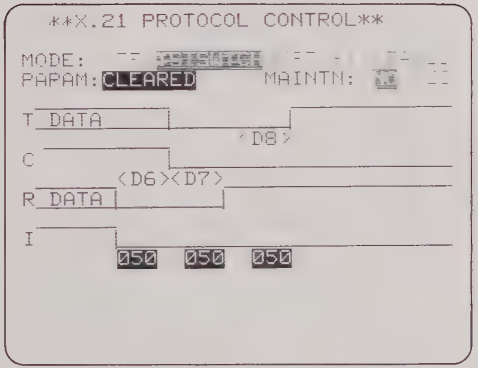


D4 is the duration of the Connection in Progress state. This state ends when the COMSTATE 1 raises its control lead to indicate Ready for Data.

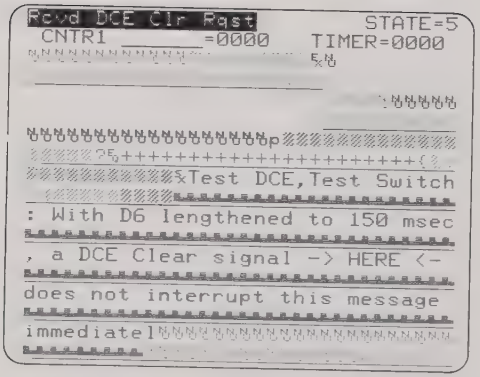
D5 is the length of time that the unit sends R=1, 1=ON (or full-intensity pad-character in the COMSTATE 1 display) before the Data Transfer state is reached. At that point, the FORMAT parameters on the PROGRAM 0 menu (SYN, BOP, and so on) are enabled. Note BOP 7E-flags in figure.

CLEARING. The user clears a call and expects network confirmation. The user site (the unit in TEST DCE, TSTSWTCH mode) controls D8, while the switching site (the unit in TEST DTE, TSTUSR mode) controls D6 and D7.

CLEARED. The switching site sends Clear indication and the user site confirms. Here the user site controls D6 and D8, and the switching site controls D7.



PROGRAM C
(cont.)

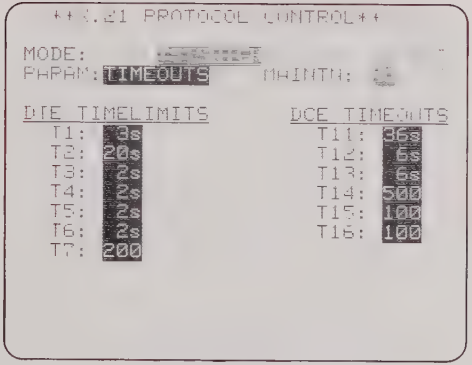


D6 is the delay time before a Clear indication from either side is confirmed by the other. D7 and D8 are delay times before Ready state is resumed after a clear.

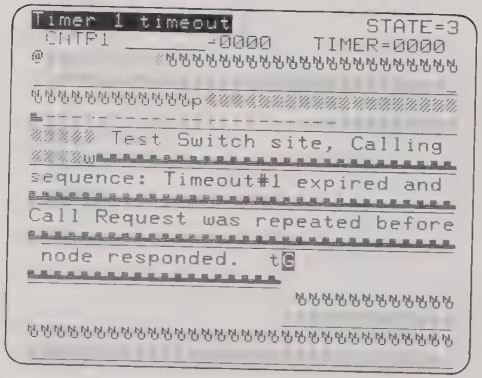
TIMEOUTS. COMSTATE 1 controls the values for the 13 basic timeouts used in X.21 circuit-switched service. Place cursor in PARAMeter field and press ROLL key to select TIMEOUTS. In TSTSWTCH mode, the unit checks the network's response times against timeouts T1 through T7. In TSTUSR mode, the user's responses are checked against timeouts T11 through T16. Time limits are controlled on the PROGRAM C menu. Default values follow CCITT Recommendation X.21.

Lower-case "s" indicates that the timeout is resolved into seconds, not milliseconds. Alter to nonstandard values, as desired.

When you move the cursor to a timeout field, the timeout is defined on line 14 of the PROGRAM C screen; that is, the events that start and stop the timer are listed.



PROGRAM C
(cont.)



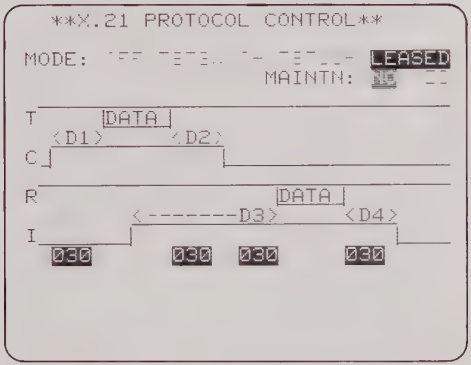
Whenever a timer controlled by the COMSTATE 1 expires, the unit calls up a prompt and performs an action that is part of the prescribed recovery procedure. See figure. You can find these actions described in CCITT Recommendation X.21, Annex C, and in X.21 Testing With the INTERVIEW COMSTATE 1 (ATLC-107-932-103), Appendix B.

MAINTN: NO/YES. MAINTN: YES allows you to maintain the voltage levels on the active static leads even after you leave RUN mode to enter PROGRAM mode. This allows you to remain, for example, in Data Transfer state while you leave RUN, enter a transmit message on the PROGRAM 7 menu, and return to RUN.

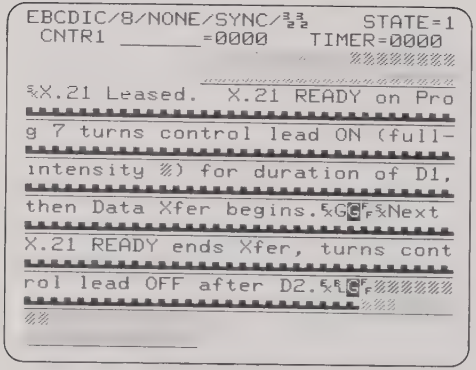
LEASED

There is a single PROGRAM C menu display for X.21 leased-circuit operation, much less complex than the timing diagrams for switched service.

The only legal X.21 selection on the Program 7 menu is X.21 READY. The first transmit action raises the control lead and initiates D1 or D3. At the end of this delay, Data Transfer begins.



PROGRAM C
(cont.)


EBCDIC/8/NONE/SYNC/3 3
2 2
STATE=1
CNTR1 =0000 TIMER=0000
%X.21 Leased. X.21 READY on Pro
g 7 turns control lead ON (full-
intensity %) for duration of D1,
then Data Xfer begins.%GF%Next
X.21 READY ends Xfer, turns cont
rol lead OFF after D2.%%F

There is no call sequence or handshake. The control lead simply changes state before and after data-transfer, with 30-millisecond delays that you can modify in the delay fields on the PROGRAM C menu. See figure.

Data Transfer does not end with the end of a transmission. To leave the Data Transfer state, return to a Program 7 state where X.21 READY is the WAIT FOR selection.

MODEM PARAMETERS

When your Printer/Remote interface is connected to a smart modem (or when the internal modem is installed), use this screen to place, answer, or hang up a call. Enter the parameters on this screen according to the requirements of your local modem; then press XEQ.

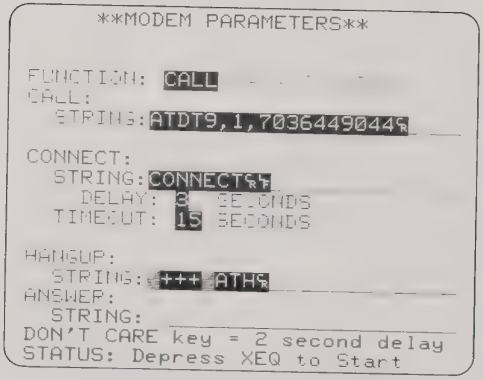
The auto-callback feature enables this screen when there is no operator on hand to press XEQ. Regardless of the selection in the FUNCTION field, the unattended COMSTATE I places a call, transmits a message, and hangs up automatically in response to a trigger.

To enable this auto-callback function, detach the COMSTATE I from the remote terminal while it is in Run mode. The operator at the remote terminal sets the trigger alarm, enters Run mode (ESC, R) to start the test, and detaches (ESC, D). The unit will attempt a callback whenever any trigger with YES selected in the ALARM field comes true.

When the optional internal modem is installed and PORT: MODEM is selected on PROGRAM A, firmware coordinates the flow of messages between the COMSTATE and the modem. Most of the fields on this menu disappear. See MODEM.

FUNCTION. Select CALL, HANGUP, or ANSWER. Then press XEQ to transmit to the modem one of the strings entered below. Use ANSWER when the connection is already made and you simply want to go from voice to data.

PROGRAM D
(cont.)



CALL STRING. Enter dial-up number of the remote modem. Include whatever dial-command characters your calling modem requires. You may need to embed delays in the call string (9, delay, 1 delay, area code, etc.) for the sake of the PBX and the local switches. DON'T CARE characters inject two-second delays into the conversation between the COMSTATE I and the modem, not in the string that the modem sends over the line. Consult modem manual for proper delay characters.

CONNECT STRING. The local external modem sends the CONNECT STRING back to the COMSTATE I after a CALL or ANSWER to confirm that the data-connect handshake has been completed.

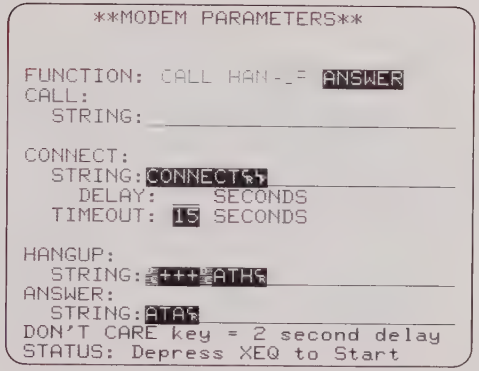
In auto-callback, if this field is blank, the COMSTATE I will send the alarm whether or not it has received a connect signal.

DELAY. Auto-callback only. The length of time after the connect string is received, before the COMSTATE I transmits the alarm. A blank field means no delay.

TIMEOUT. The time the COMSTATE I will wait for a connect string after sending the call or the answer command. In auto-callback, after timeout the unattended unit will not send the alarm and prompt. In manual (XEQ) operation, after timeout the COMSTATE gives its operator a negative message ("NO ANSWER," for example).

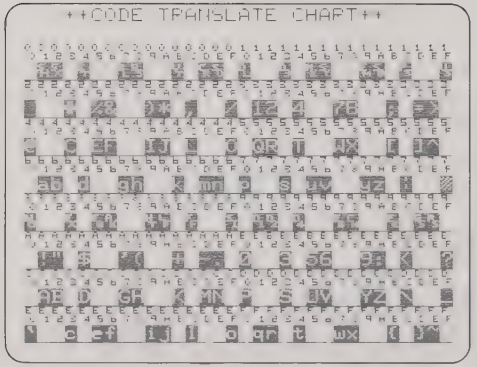
A blank TIMEOUT field means the maximum timeout, 65 seconds.

HANGUP STRING. This string tells the modem to hang up. In auto-callback, the COMSTATE I transmits the HANGUP STRING immediately after it has sent the alarm. If the correct string



is not entered, the COMSTATE I will remain online with the remote terminal.

ANSWER STRING. This string tells the modem to answer, even though there is no ring. Used to convert a voice connection to data.



CODE TRANSLATE CHARTS

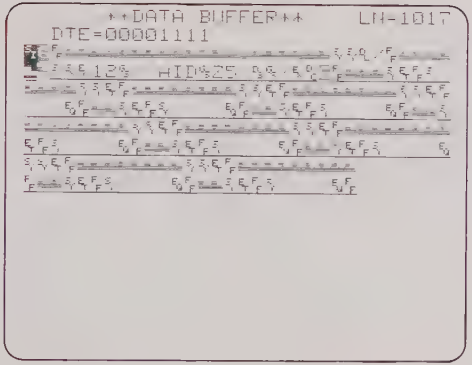
On the PROGRAM 0 menu, select CODE, number of information BITS, and +PARITY. Then press PROGRAM, E, to see the Code Translate Chart used by the COMSTATE I for the selected code, bits, and parity.

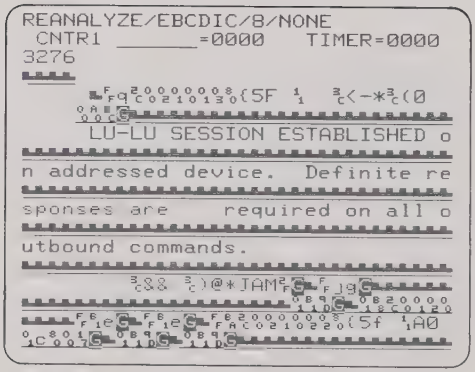
The code translate chart shown is for ASCII, 7 information bits, odd parity.

DATA BUFFER

Data captured in the Data Buffer while the COMSTATE I is in Run Mode is not cleared when you press the PROGRAM key. You can view it by pressing PROGRAM, F. See FREEZE for further information.

The Data Buffer is cleared each time the RUN key is operated.





The entire 64-kilobyte Data Buffer can be routed to simulated (software) receivers that reanalyze the data as though it were viewed on the line for the first time. The eight triggers are enabled, and a test or a series of tests can be run against the captured data.

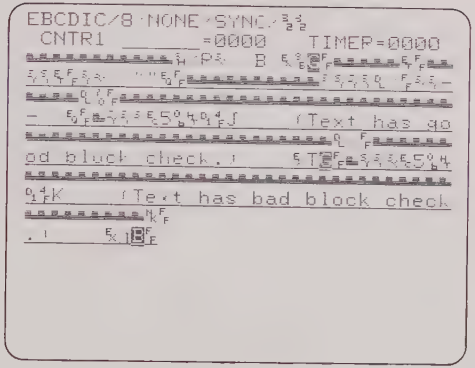
To view the contents of the Data Buffer running sequentially as though it were live data, press PROGRAM, 0, and ROLL the MODE window until REANALYZE is selected.

Press RUN. The Data Buffer empties its contents one byte at a time into simulated receivers that display the data on the screen and then return it to the data buffer for the next reanalysis.

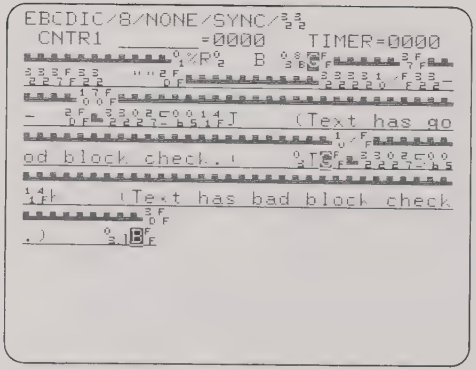
(Remember that any data that you SUPPRESS -- 7E flags, for example -- is lost from the CRT data buffer and cannot be used later for triggering.)

With Received Block Check ON (PROG 0), the last block check character for each block is replaced with a low-intensity, reverse-image G for Good or B for Bad block. An aborted block is shown with a bright, reverse-image A (BOP and B/NRZI only). With Received Block Check OFF, all block check characters are displayed.

Counter and Timer Display. The Counters and Timer are controlled by triggers (PROG 1, then 1-8). For real-time display of the various counters, press keys 1 through 4.



RUN
(cont.)



Parity Errors. With +PARITY selected (PROGRAM 0), all characters with parity errors are displayed with bars through them.

HEX key displays all data in hexadecimal, while CTRL-HEX displays only protocol control characters for the selected code in hexadecimal.

STATE NO. The number of the current state of the Interactive Test (PROGRAM 7 menu).

RUN restarts the trigger program, as well as the Interactive Test, resets the counter and timer, and resets the CRT Data Buffer.

For Software Version 2.02B and higher:

0(ww, xxxx, yy, zz)RAM	
1	PROM AA
2	PROM AB
3	PROM AC
4	PROM AD
5	PROM AE
6	PROM AF
77	PROM AG
8	PROM AH
9	PROM AJ
A	PROM AK
BB	PROM AL
CC	PROM AM

TERMINAL

The COMSTATE I has two terminal modes, one selected on Program 6 and the other on Program A. The Program A terminal mode is designed for controlling a remote unattended COMSTATE I (or INTERVIEW 30B/40B). The Program 6 Terminal mode will also control a remote interview; but the front-panel Program 6 interface is inappropriate for carrying out other remote-transfer functions.

The accompanying table contrasts the two separate Terminal emulations. Also see PROGRAM 6 and PROGRAM A.

PROGRAM A TERMINAL

Uses Printer/Remote interface (or phone jack if modem option installed).

Emulates a DCE.

Program 0 not applicable.

Triggers and enhancements inoperative.

Press XEQ to enable.

Cursor-arrow keys transmit control characters online to remote unattended unit. (To scroll through local CRT buffer, press SHIFT UP/DOWN ARROW.)

PROGRAM 6 TERMINAL

Uses front-panel interface.

Emulates a DTE (TEST DCE).

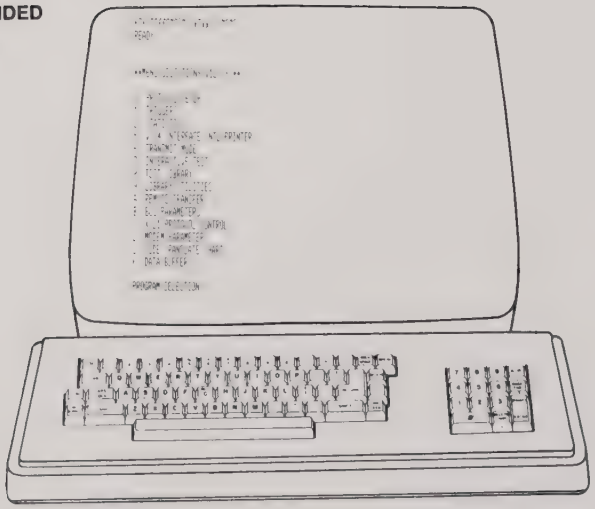
Program 0 parameters selectable.

Triggers and enhancements operative.

Press RUN to enable.

Cursor-arrow keys (in Freeze or Data Buffer mode) scroll through CRT buffer.

UNATTENDED REMOTE



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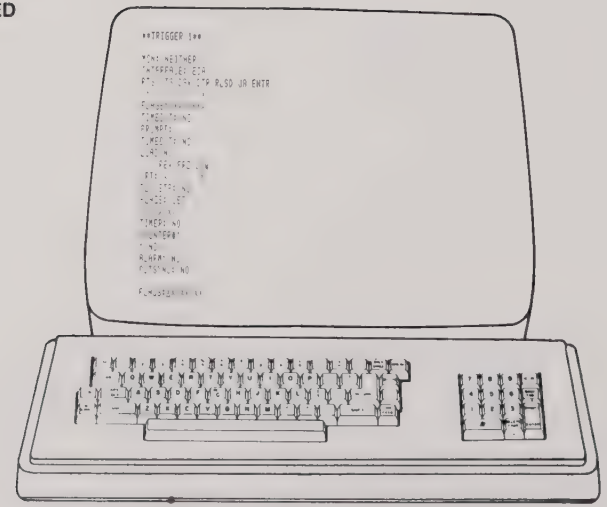
Functions that can be commanded by an operator at a COMSTATE I keyboard can also be controlled remotely (via modems) from a dumb/ANSI terminal or from a COMSTATE I (or other INTERVIEW device) in Terminal mode. This includes remote-transfer features.

Usually the unattended COMSTATE I is connected to an external modem at its PRINTER/REMOTE PORT, with the INTERVIEW-to-Modem cable. (Units with the optional internal modem have a separate telephone interface. See MODEM.) When the COMSTATE I is under remote control it transmits asynchronous data with 7 data bits and space parity.

Once the communication line is established, the operator attaches the unattended COMSTATE I by depressing the BREAK key on the remote terminal. The COMSTATE returns a "READY" response to the terminal. Several BREAKs may be required before the unattended unit is trained to the appropriate data speed.

Function or Keystroke Effected on Unattended COMSTATE I	Remote Operator Using Dumb/ANSI Terminal	Remote Operator Using COMSTATE I as Program A Terminal	Remote Operator Using ANSI Keypad
Attach/Detach			
(Attach)	BREAK	CTRL \ (@)	
(Detach)	ESC, D	CTRL +, D	

UNATTENDED REMOTE (cont.)



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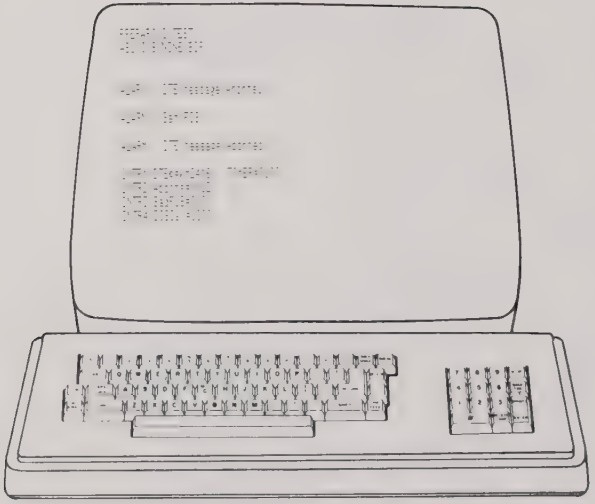
An operator at a remote terminal can use the terminal to program the unattended COMSTATE I manually (menu by menu). Or he can load a program from internal memory (see PROGRAM 9). If the remote terminal is another COMSTATE I in Terminal mode, the operator can download programs as well. See PROGRAM A.

Function or Keystroke Effected on Unattended COMSTATE I	Remote Operator Using Dumb/ANSI Terminal	Remote Operator Using COMSTATE I as Program A Terminal	Remote Operator Using ANSI Keypad
Modes			
PROGRAM	ESC, P	CTRL +, P	
RUN	ESC, R	CTRL +, R	
XEQ	ESC, X	CTRL +, X	
Program Mode: Screen Display			
(Repeat last message)	CTRL R	CTRL R	
(List whole screen)	CTRL A	CTRL A	
(Stop listing)	CTRL S (XOFF)	CTRL S (XOFF)	
(Continue listing)	CTRL Q (XON) or any key	CTRL Q (XOFF) or any key	
CLEAR field	CTRL C or ESC, [, K	CTRL C or CTRL +, CTRL 8, K	
CTRL CLEAR	CTRL Z or ESC, [, J	CTRL Z or CTRL +, CTRL 8, J	
Program Mode: Cursor Control			
ROLL left	CTRL H or ESC, [, D	CTRL H or LEFT ARROW or CTRL +, CTRL 8, D	SHIFT 4

Function or Keystroke Effected on Unattended COMSTATE I	Remote Operator Using Dumb/ANSI Terminal	Remote Operator Using COMSTATE I as Program A Terminal	Remote Operator Using ANSI Keypad
ROLL right	CTRL L or ESC, [, C	CTRL L or RIGHT ARROW or CTRL +, CTRL 8, C	SHIFT 6
ENTER (next field)	CTRL J or CTRL M or RETURN or ENTER or ESC, i, B	CTRL J or RETURN or ENTER or DOWN ARROW or CTRL +, CTRL 8, B	SHIFT 2
(Previous field)	CTRL K or ESC, [, A	CTRL K or UP ARROW or CTRL +, CTRL 8, A	SHIFT 8
SHIFT LEFT ARROW (to delete character)	DELETE or ESC, [, P	DEL (CTRL _) or CTRL +, CTRL 8, P	SHIFT 9
SHIFT RIGHT ARROW (to insert character)	ESC, [, 4, h	CTRL +, CTRL 8, 4, h	SHIFT 7
SHIFT DOWN ARROW (to insert line on Program 7 screen)	ESC, [, L	CTRL +, CTRL 8, L	SHIFT 1
SHIFT UP ARROW (to delete line on Program 7 screen)	ESC, [, M	CTRL +, CTRL 8, M	SHIFT 3
CTRL ENTER (to reach page 2 of Screen 7)	ESC, RETURN	CTRL +, RETURN	

Function or Keystroke Effected on Unattended COMSTATE I	Remote Operator Using Dumb/ANSI Terminal	Remote Operator Using COMSTATE I as Program A Terminal	Remote Operator Using ANSI Keypad
Program Mode: Special Data-Entry Characters			
HEX	#XY	#XY	
#	##	##	
Control characters	\, 1st mnemonic character, last mnemonic character. Examples: \D1, \EQ, \SX, \EX, \EB, \ET Exceptions: \SY (for SYN), \PD (for DEL), \NU (for NULL)	\, 1st mnemonic character, last mnemonic character. Examples: \D1, \EQ, \SX, \EX, \EB, \ET Exceptions: \SY (for SYN), \PD (for DEL), \NU (for NULL)	
\	\\	\\	
FLAG/FOX	\7E or \FM	\7E or \FM	
NOT EQUAL	\NE Example: \NE\7E	\NE Example: \NE\7E	
DON'T CARE	\DC	\DC	
BIT MASK/MSG	\BM (followed by RETURN for Bit Mask string)	\BM (followed by RETURN for Bit Mask string)	

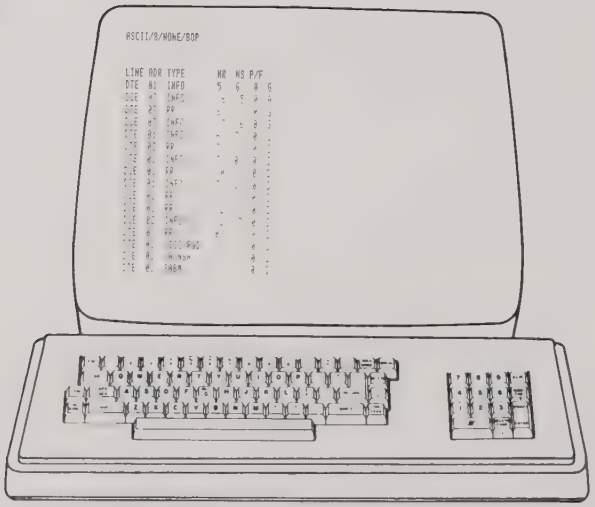
UNATTENDED REMOTE (cont.)



The remote operator can command the unattended COMSTATE to run a test. During the test, the operator receives real-time prompts, alarms and statistics.

Function or Keystroke Effected on Unattended COMSTATE I	Remote Operator Using Dumb/ANSI Terminal	Remote Operator Using COMSTATE I as Program A Terminal	Remote Operator Using ANSI Keypad
Run Mode			
FREEZE (remote CRT, triggers, and test activity; also display CRT buffer for current screen)	F	F	
Unfreeze	F	F	
("Tally": List Program 2 or BERT statistics without interrupting test)	T	T	
DON'T CARE (to inject bit error into BERT test)	E	E	
CLEAR (to clear BERT counters)	C	C	

UNATTENDED REMOTE (cont.)



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After the test, the operator can analyze the unattended unit's data buffer in detail. See accompanying table. See also PROGRAM F; FREEZE; and X.25 TRACE DISPLAY.

Function or Keystroke Effected on Unattended COMSTATE I	Remote Operator Using Dumb/ANSI Terminal	Remote Operator Using COMSTATE I as Program A Terminal	Remote Operator Using ANSI Keypad
Program F: Data Buffer			
B (to display first screen in buffer)	B	B	
E (to display last screen in buffer)	E	E	
SHIFT or CTRL DOWN ARROW (to display next screen)	CTRL J or CTRL M or RETURN or ENTER or ESC, [, B	CTRL J or RETURN or ENTER or DOWN ARROW or CTRL +, CTRL 8, B	SHIFT 2
SHIFT or CTRL UP ARROW (to display previous screen)	CTRL K or ESC, [, A	CTRL K or UP ARROW or CTRL +, CTRL 8, A	SHIFT 8
(Display data buffer from beginning to end)	CTRL A	CTRL A	
1 (to display current screen in data format)	1	1	1
2 (to display current screen in HDLC/SDLC frame-trace display)	2	2	2

Function or Keystroke Effected on Unattended COMSTATE I	Remote Operator Using Dumb/ANSI Terminal	Remote Operator Using COMSTATE I as Program A Terminal	Remote Operator Using ANSI Keypad
3 (to display current screen in X.25 packet-trace display)	3	3	3
4 (to display current screen in X.25 combined frame-packet trace display)	4	4	4
HEX	H	H	
CTRL HEX	C	C	
(Stop display)	CTRL S (XOFF)	CTRL S (XOFF)	
(Continue display)	CTRL Q (XON) or any key	CTRL Q (XON) or any key	
(Scroll up remote buffer; no effect on unattended COMSTATE I)		SHIFT UP ARROW	
(Scroll down remote buffer; no effect on unattended COMSTATE I)		SHIFT DOWN ARROW	

The 25-pin "generic" X.21/V.35 connector is at the far right of the INTERFACE ACCESS area on the front of the COMSTATE I, below the RS-232 connector. Included in your shipment were two adaptor cables each with one 25-pin female connector. One adaptor cable converts the X.21/V.35 generic connector to X.21. The other cable provides a V.35 interface. Whenever the COMSTATE I monitors or tests an X.21 or a V.35 data line, the line should be connected to the front panel via one of these adaptor cables and this connector.

Two columns of patch jacks are to the left of the X.21/V.35 connector. These jacks correspond to all of the X.21 leads and to some of the V.35 leads -- the balanced two-wire (data and clock) signals only. V.35 balanced leads are the following, with their pin designators in parentheses: TD (P, S), RD (R, T), SCTE (U, W), SCT (Y, AA), and SCR (V, X). Using the twisted-pair patch cord provided with the COMSTATE I, you may patch any of these pairs of leads to the leads at the left of the breakout switches, or to the leads in the Unassigned Input area.

The patch jacks for unbalanced V.35 leads are found on the upper part of the Interface Access area, where they correspond to the RS-232 leads of the same or similar name. Unbalanced V.35 control leads are the following: PROT GD (A), SG (B), RTS (C), CTS (D), RLSD (F), DTR (H), and DSR (E).

To the left of the patch jacks are sets of breakout switches. The DIP switches conduct signals straight through, or they open the circuits so that you can reroute them using the single or twisted-pair patch cords.

V.35
INTERFACE
(cont.)

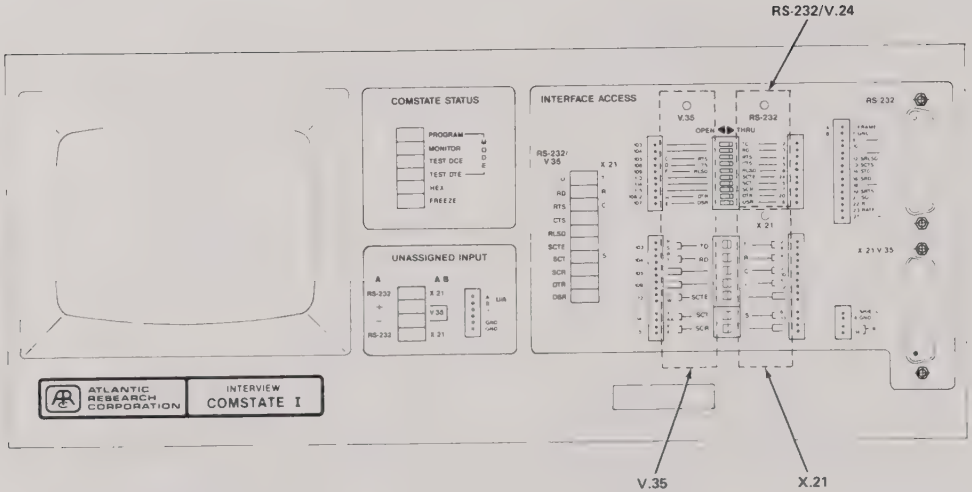

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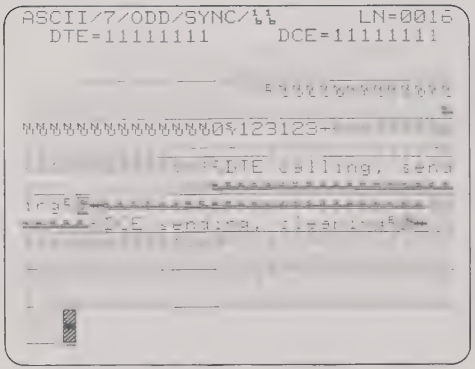
Figure 5

To the left of the breakout switches is another column of patch jacks. Use these jacks to access those signals actually received or transmitted by the COMSTATE I.

The UNASSIGNED INPUT area is at the bottom left of the Interface Panel. You can patch any single (unbalanced) V.35 lead or pair of V.35 balanced leads in the unassigned input. For unbalanced leads, use only the A lead for patching.



The COMSTATE I can emulate DTE or DCE either at the user site or at a network mode to perform various call and clear sequences in X.21. In addition, the operator can define Selective Direct Call numbers; Selection Signals; DCE-provided information; delay times in 8 distinct X.21 states; and control timeout values for 13 standard X.21 transitions.

To operate in X.21, first make the selection for CONNECTOR: X.21 on the PROGRAM 0 menu. (RS-232 is appropriate for X.21bis.) Then select TSTSWTCH, TSTUSR or LEASED on the PROGRAM C menu. If you are constructing an interactive test, see PROGRAM 7 and PROGRAM C in this booklet.

Except in Data Transfer state, where you can program the unit to suppress idle characters (PROGRAM 0 menu), the COMSTATE I displays on its screen the status of all four control (C,I) and data (T,R) leads at all times. This means that during a call or a clear sequence, you can observe every change in state on the data display, without relying on the lead-indicator lights on the front panel.

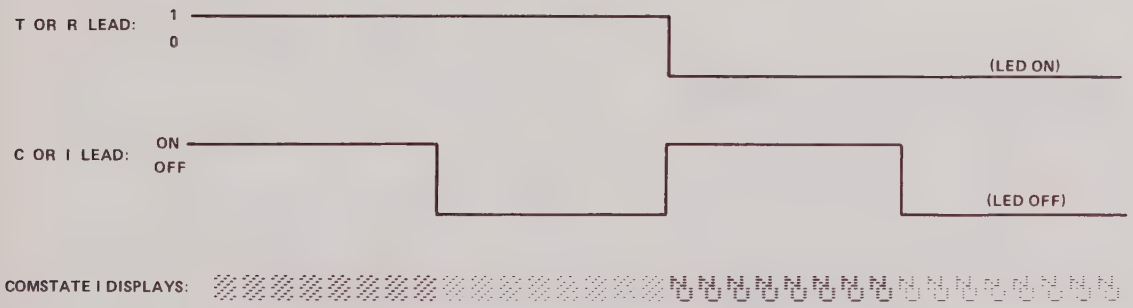
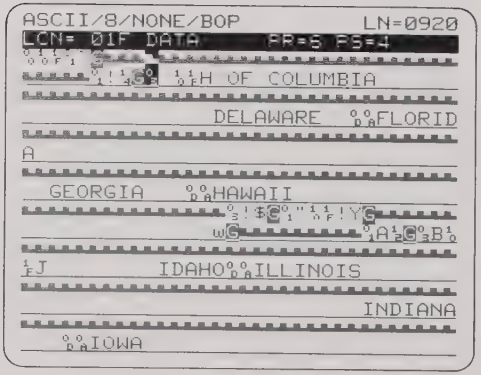


Figure 6. The COMSTATE I display during the four possible combinations of the control and data leads in steady state. Note that when the control lead goes off, the display changes to low intensity. Use this diagram to correlate the various timing diagrams on the PROGRAM C menu with the COMSTATE I's data display.

X.25 TRACE DISPLAY



Can be used for BOP or B/NRZI. Display must be frozen (FREEZE, DELAY STOP, or PROGRAM F).

See Table 16-1 of Technical Manual for the protocol mnemonic set used by the COMSTATE 1.

Protocol Trace Display (Freeze Mode)

2 Key. Frame-Level Protocol Trace Display (for HDLC or SDLC protocols).

3 Key. Packet-Level Protocol Trace Display (for HDLC, MOD 8 and MOD 128).

4 Key. Combined Frame- and Packet-Level Trace Display for HDLC-X.25.

1 Key. Returns the data display.

The figure shows a frame-level trace display for SDLC data.

Automatic Frame and Packet Analysis

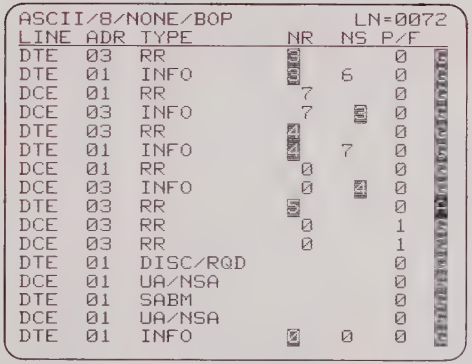
F Key. Positions cursor on first (address) byte of next frame and displays frame protocol information on line 2.

P Key. Positions cursor on first (address) byte of next information frame and displays packet protocol information on line 2.

Manual Frame and Packet Analysis

Dual-Line Display. Press T to select TD; R to select RD. Use cursor-control keys to position cursor on first (address) byte of frame. Then SHIFT-F displays frame protocol information for that frame; SHIFT-P, packet protocol information.

The figure shows an analysis of the DCE (underlined) packet at the bottom of the screen.


ASCII/8/NONE/BOP LN=0072
LINE ADR TYPE NR NS P/F
DTE 03 RR 0 0
DTE 01 INFO 0 6 0
DCE 01 RR 7 0
DCE 03 INFO 7 0 0
DTE 03 RR 0
DTE 01 INFO 7 0
DCE 01 RR 0 0
DCE 03 INFO 0 0 0
DTE 03 RR 0 0
DCE 03 RR 0 1
DCE 03 RR 0 1
DTE 01 DISC/RQD 0
DCE 01 UA/NSA 0
DTE 01 SABM 0
DCE 01 UA/NSA 0
DTE 01 INFO 0 0 0

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Triggers	PROGRAM 1
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V.35	V.35 Interface
X.21	PROGRAM 0, 1, 2, 7, C; X.21 Operation

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